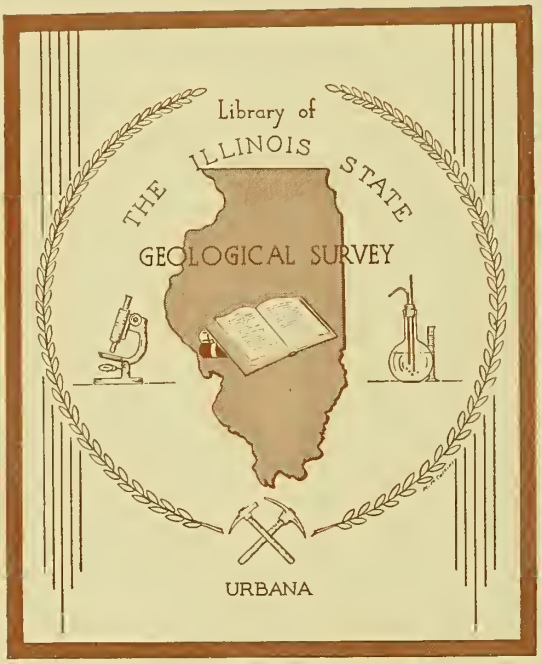

STATE OF ILLINOIS
DEPARTMENT OF REGISTRATION AND EDUCATION
DIVISION OF THE
STATE GEOLOGICAL SURVEY
M. M. LEIGHTON, *Chief*

REPORT OF INVESTIGATIONS—NO. 25

# ILLINOIS MINERAL INDUSTRY IN 1931

## A Preliminary Statistical Summary and Economic Review

BY

W. H. VOSKUIL and ALMA R. EICH

PRINTED BY AUTHORITY OF THE STATE OF ILLINOIS

URBANA, ILLINOIS
1932

STATE OF ILLINOIS

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# Foreword

The mineral industries of Illinois occupy an important strategic position in the industrial activities of the Upper Mississippi states and of the Nation as well.

This preliminary summary of the mineral production and review of economic conditions of the State of Illinois is issued for the information of the State's mineral producers. It is planned that similar reports will be issued in successive years early in the year in order to assist the producers in formulating their production policies for the current program. These preliminary reports are issued before complete returns have been received and therefore are subject to revision. Final figures will, in due time, be issued by the United States Bureau of Mines and the United States Bureau of the Census, the latter covering clay products.

This report is made possible through the cooperation of the United States Bureau of Mines and the United States Census Bureau, through the active collection and publication of coal statistics by the Illinois State Department of Mines and Minerals, and through the cooperation of the mineral producers of the State in complying with requests for information.

Economic studies of the competitive conditions in the natural market area of Illinois minerals and the position of the State's mineral industries in that area will now be studied by the new Economics Section of the Illinois Geological Survey and reports will be issued from time to time. Consumption and movements of minerals will be emphasized.

It will be helpful in the preparation of future issues if users of this report will offer their criticisms and suggestions for improvement.

M. M. Leighton, *Chief*

April 28, 1932

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# ILLINOIS MINERAL INDUSTRY IN 1931

By W. H. Voskuil and Alma R. Eich

## STATISTICAL SUMMARY OF ILLINOIS MINERAL INDUSTRIES IN 1931

The year 1931 was characterized by a decrease in output and a decline in unit value of all the principal mineral products in Illinois. A study of business cycles has shown that unit values of mineral products reflect regularly changes in business conditions.[1] Thus the decrease in total sales realizations in 1931, accounted for by a falling off in output and a decrease in unit prices, are explained by the world-wide business depression that affected most lines of industrial activity.

Coal production decreased 20 per cent, which is the lowest in the postwar period. Clay products, sand, gravel, and limestone reflect the sharp decline in the building industries—the most severe decline since 1920. The minor industrial minerals, fluorspar, quartz, and sandstone, followed the downward trend in common with the industries upon which they are dependent. A summarized statement of production and value for 1930 and 1931 is given in Table 1.

## COAL

### Review of Production

Coal production in 1931 in Illinois followed the downward trend of the industry as a whole, declining 20 per cent in tonnage from that of 1930, and reaching a level of production 46 per cent below that of 1923. The sharp decline in the years 1930 and 1931 were due in part, to the industrial depression but 15 to 20 million tons of the loss since 1923 is the result of the invasion of the Illinois coal markets by Appalachian coal. This increased importation of the Appalachian coal from West Virginia and eastern Kentucky into the Illinois coal market territory is primarily the result of a low wage scale in the Appalachian area. An increase in shipment

[1] Mitchell, W. C., Business Cycles: University of California Press, p. 572, 1913.

TABLE 1.—*Preliminary summary of production and value of Illinois minerals for 1930 and 1931*

| Product | 1930 | | 1931 | |
|---|---|---|---|---|
| | Tons | Value | Tons | Value |
| Coal | 54,035,116 | $93,484,000 | 42,793,383 | [b]$71,600,000 |
| Pig iron | 3,050,743 | [c]54,290,144 | [a] | [a] |
| Clay products | ..... | 19,972,156 | ..... | 10,585,136 |
| Coke | 3,576,577 | 21,379,784 | 2,461,217 | [b]14,275,000 |
| Cement (barrels) | 7,951,680 | 10,519,162 | 6,380,000 | 5,310,000 |
| Sand and gravel (total) | 17,398,693 | 8,382,025 | 10,462,391 | 5,143,826 |
| Structural sand | 2,685,313 | 1,258,618 | 1,889,757 | 735,029 |
| Paving and road-making sand | 2,905,191 | 1,073,470 | 1,668,587 | 718,984 |
| Glass sand | 489,824 | 490,533 | 416,366 | 416,066 |
| Molding sand | 589,238 | 455,416 | 327,097 | 246,858 |
| Railroad ballast sand | 535,670 | 118,659 | 246,727 | 55,333 |
| Cutting, grinding and blast sand | 322,976 | 657,689 | 170,752 | 427,102 |
| Engine sand | 112,184 | 63,723 | 76,082 | 39,777 |
| Fire or furnace sand | 41,416 | 29,392 | 2,684 | 5,127 |
| Other sands | 1,749,351 | 840,505 | 245,876 | 122,687 |
| Paving and road-making gravel | 4,873,777 | 2,067,529 | 3,539,315 | 1,599,762 |
| Structural gravel | 1,947,176 | 981,412 | 1,290,073 | 597,697 |
| Railroad ballast gravel | 1,140,297 | 342,306 | 573,097 | 169,338 |
| Other gravel | 6,280 | 2,773 | 15,978 | 10,066 |
| Petroleum (barrels) | 5,736,000 | 9,100,000 | 5,023,000 | 4,280,000 |
| Limestone (total) | 7,538,810 | 5,909,089 | 5,209,095 | 3,921,457 |
| Road metal and concrete | 4,637,390 | 3,355,031 | 3,600,769 | 2,391,763 |

| Product | 1930 | | 1931 | |
|---|---|---|---|---|
| | Tons | Value | Tons | Value |
| Flux | 604,890 | 537,829 | 460,087 | 393,645 |
| Railroad ballast | 475,720 | 346,032 | 361,637 | 241,619 |
| Rip-rap | 820,090 | 763,624 | 291,112 | 292,762 |
| Agriculture | 868,430 | 740,785 | 247,269 | 227,020 |
| Rubble | 3,440 | 5,199 | 4,412 | 5,450 |
| Other uses | 128,850 | 160,589 | 243,809 | 369,199 |
| Mineral paints, zinc and lead pigments | ..... | ..... | ..... | ..... |
| Natural gasoline (gallons) | 6,839,538 | 419,601 | [a] | [a] |
| Natural gas | ..... | ..... | ..... | ..... |
| Lime (total) | 89,709 | 721,143 | 71,317 | 547,680 |
| Building | 31,535 | 283,273 | 18,683 | 156,485 |
| Tanneries | 6,977 | 56,210 | 6,700 | 56,055 |
| Metallurgy | 4,126 | 30,499 | 5,157 | 33,648 |
| Paper mills | 5,926 | 41,331 | 2,737 | 18,497 |
| Other uses | 41,145 | 309,830 | 38,041 | 218,109 |
| Fluorspar | 44,134 | 836,473 | 28,072 | 468,386 |
| Quartz (silica) | 71,976 | 438,757 | 56,262 | 335,219 |
| Clay | 184,555 | 371,645 | 107,712 | 211,873 |
| Tripoli | 7,739 | 110,880 | 14,956 | 117,416 |
| Lead | ..... | ..... | [a] | [a] |
| Sandstone | 52,110 | 30,208 | 45,102 | 25,843 |
| Zinc | ..... | ..... | [a] | [a] |
| Total value | | $171,674,923 | | $116,815,798 |

[a] Figures not yet available.
[b] Estimated.
[c] Value not included in the total.

of coal from important eastern fields[2] from 10 million tons in 1917 to 25 million tons in 1929[3] has been accomplished apparently at the expense of a prosperous industry in southern Illinois.

Table 2 shows the decline of coal production in the United States since 1918 and the declining percentage supplied by Illinois. It should be noted that a part of the loss of coal markets is due to a declining demand for coal in the post-war period.

TABLE 2.—*Coal production, United States and Illinois, 1918-1931*
(In millions of tons)

| Year | United States[a] | Illinois[b] | Illinois Percentage of total |
|---|---|---|---|
| 1918 | 579.4 | 89.3 | 15.4 |
| 1919 | 465.9 | 60.9 | 13.1 |
| 1920 | 568.7 | 88.7 | 15.6 |
| 1921 | 415.9 | 69.6 | 16.7 |
| 1922 | 422.3 | 58.5 | 13.9 |
| 1923 | 564.6 | 79.3 | 14.0 |
| 1924 | 483.7 | 68.3 | 14.2 |
| 1925 | 520.1 | 66.9 | 12.9 |
| 1926 | 573.4 | 69.4 | 12.1 |
| 1927 | 517.8 | [c]46.8 | 9.0 |
| 1928 | 500.7 | 55.9 | 11.1 |
| 1929 | 535.0 | 60.7 | 11.3 |
| 1930 | 467.6 | 53.3 | 11.4 |
| 1931 | 378.1 | 42.8 | 11.4 |
| Total | 6,993.2 | 910.4 | 13.0 |
| Average | 499.5 | 65.0 | 13.0 |

[a] U. S. Bureau of Mines.
[b] From records of the Illinois State Department of Mines and Minerals.
[c] Seven months' production due to miners' strike.

The principal losses have occurred in fuel used by railroads, where the use of fuel oil, increased efficiency, and the industrial depression have reduced railroad coal consumption from 138.8 million tons in 1918 to 82 million tons[4] in 1931.

Next to the railroads, a notable decline of coal consumption has occurred in the manufacturing industries, many of which have been electrified. Electrification has increased from 5 per cent of the primary horsepower used in manufacturing in 1904 to 78 per cent of that used in 1929. Both privately developed electrical power and energy purchased from public utilities —the latter more rapidly—have increasingly replaced mechanical power.

[2] Kanawha, Logan, Kenova-Thacker, New River, Winding Gulf, Pocahontas, Tug River, in West Virginia, and McRoberts, Hazard, Harlan-Benham, in eastern Kentucky.
[3] Supplements to Monthly Coal Distribution Reports Nos. 3 and 4; U. S. Bureau of Mines, October, 1931 and November, 1931.
[4] Estimate based on consumption during eleven months of the year.

It is quite probable, generally speaking, that electricity is produced in public utility plants with greater fuel economy than in private plants, so that the transfer of power generation from the private plant has also definitely resulted in less coal consumption, just how much it is difficult to say.

The losses which the Illinois coal industry has suffered through competition from other coal fields is indicated in the last column of Table 2. If the ratio of output of 1918 had been maintained, the production in Illinois in 1931 would have been approximately 15 million tons more than it was or 58 million tons, and in 1930 it would have been 19 million tons more or about 72 million tons. This would have meant an increased disbursement of wages of from 15 to 20 million dollars and a greater economic stability in the communities of the principal coal producing sections of the state. Recovery of former markets is the immediate step necessary for the rehabilitation of the Illinois coal industry.

The production of coal by months, for 1931, is given in Table 3 (p. 12).

## Distribution and Consumption of Illinois Coal

### ILLINOIS COAL MARKET AREA

The natural market area for Illinois coal extends westward and northward into Missouri, Iowa, eastern Kansas, Nebraska, Wisconsin, Minnesota, and the Dakotas. In the Lake Dock states of Wisconsin, Minnesota, and the Dakotas, the market is contested by lake cargo coal from the Appalachian fields. Very little Illinois coal moves eastward because of the supply from the Indiana and Appalachian fields. The energy markets to the south along Mississippi River are supplied by western Kentucky coal or by fuel oil and natural gas from the Mid-Continent and Gulf fields.

The movement of coal from producing field to consuming state has been traced in a special study by the United States Bureau of Mines.[5] The year 1929 was chosen for analysis as being more representative of normal conditions than the "depression" years of 1930 and 1931. It is the first survey of this kind since 1917[6] and in the intervening years notable changes have taken place in the distribution and utilization of Illinois coal. (Table 4, p. 13).

[5] Supplement to Monthly Coal Distribution Report Nos. 1, 3, 4, and 6; U. S. Bureau of Mines, Aug., Oct., Nov., 1931, and Jan., 1932.
[6] Coal in 1917, Part B. Distribution and Consumption, U. S. Bureau of Mines.

TABLE 3.—*Coal production in Illinois, 1931* [a]
(By counties and by months)

| County | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Christian | 343,604 | 255,846 | 303,923 | 222,918 | 218,433 | 176,529 | 171,368 | 190,458 | 230,431 | 283,114 | 242,108 | 299,245 | 2,938,477 |
| Clinton | 31,477 | 15,249 | (b) | (b) | (b) | (b) | (b) | (b) | (b) | 22,409 | 13,368 | 19,172 | 101,675 |
| Franklin | 1,100,276 | 751,894 | 874,872 | 556,924 | 660,593 | 524,781 | 611,420 | 973,166 | 899,470 | 936,226 | 740,632 | 908,886 | 9,539,140 |
| Fulton | 133,538 | 106,980 | 128,216 | 93,810 | 80,494 | 75,757 | 68,409 | 68,929 | 87,271 | 113,218 | 100,325 | 143,606 | 1,200,553 |
| Henry | 45,408 | 42,429 | 44,138 | 45,195 | 44,531 | 44,626 | 45,650 | 46,705 | 43,333 | 46,795 | 43,652 | 50,740 | 543,202 |
| Jackson | 183,880 | 152,290 | 200,137 | 125,766 | 150,093 | 158,910 | 146,876 | 160,814 | 141,205 | 176,783 | 148,259 | 144,189 | 1,889,202 |
| LaSalle | 20,159 | 16,249 | 19,792 | 15,516 | 12,282 | 9,209 | 10,478 | 11,878 | 11,208 | 13,866 | 13,580 | 16,108 | 170,325 |
| Macoupin | 395,471 | 390,684 | 388,015 | 328,559 | 299,596 | 299,398 | 300,829 | 298,720 | 281,252 | 340,809 | 307,503 | 353,708 | 3,984,444 |
| Madison | 172,910 | 133,492 | 144,568 | 85,530 | 48,321 | 43,944 | 43,917 | 61,402 | 72,360 | 124,443 | 98,755 | 101,197 | 1,130,839 |
| Marion | 41,167 | 29,317 | 37,518 | 22,899 | 24,783 | 23,268 | 18,813 | (b) | (b) | 41,787 | 33,012 | 42,075 | 314,639 |
| Montgomery | 140,589 | 110,759 | 139,622 | 94,317 | 87,621 | 86,987 | 80,846 | 81,993 | 91,577 | 120,157 | 111,950 | 120,773 | 1,267,191 |
| Peoria | 94,999 | 98,272 | 75,592 | 73,947 | 71,530 | 84,338 | 85,160 | 84,052 | 92,628 | 87,010 | 82,448 | 99,831 | 1,029,807 |
| Perry | 314,699 | 241,684 | 256,653 | 210,070 | 220,928 | 221,702 | 219,131 | 236,804 | 219,090 | 264,964 | 244,761 | 280,770 | 2,931,256 |
| Randolph | 51,854 | 41,762 | 50,396 | 37,237 | 28,793 | 28,990 | 23,026 | 29,763 | 29,729 | 39,271 | 33,014 | 28,142 | 421,977 |
| Saline | 367,737 | 259,724 | 271,949 | 168,720 | 214,808 | 156,643 | 190,029 | 245,042 | 266,830 | 303,249 | 256,884 | 296,242 | 2,997,857 |
| Sangamon | 359,819 | 276,421 | 327,746 | 234,657 | 219,233 | 233,146 | 217,059 | 224,776 | 222,901 | 312,528 | 273,698 | 302,282 | 3,204,266 |
| St. Clair | 269,685 | 218,147 | 283,593 | 155,994 | 136,493 | 142,501 | 144,361 | 156,148 | 183,616 | 274,172 | 215,661 | 258,500 | 2,438,871 |
| Tazewell | 32,220 | 24,580 | 28,203 | 17,565 | 16,667 | 11,489 | 13,261 | 13,850 | 19,072 | 28,648 | 20,391 | 25,375 | 251,321 |
| Vermilion | 262,815 | 217,440 | 249,829 | 196,784 | 172,695 | 163,208 | 167,565 | 148,559 | 148,767 | 184,357 | 177,229 | 216,638 | 2,305,886 |
| Washington | 39,494 | 31,710 | 35,155 | 30,685 | 25,873 | 28,137 | 23,602 | 30,072 | 31,986 | 32,906 | 32,102 | 37,092 | 378,814 |
| Williamson | 351,717 | 246,382 | 289,699 | 141,858 | 109,522 | 121,376 | 80,110 | 103,021 | 118,689 | 120,741 | 163,899 | 175,078 | 2,072,092 |
| Woodford | 6,750 | 3,703 | (b) | 4,142 | (b) | (b) | (b) | (b) | 4,940 | 4,790 | 4,950 | 5,417 | 34,692 |
| Other Counties | 157,842 | 130,996 | 141,891 | 115,431 | 105,490 | 109,920 | 102,659 | 133,719 | 156,190 | 171,071 | 150,109 | 171,529 | 1,646,847 |
| Total | 4,918,110 | 3,796,010 | 4,291,507 | 3,028,524 | 2,949,279 | 2,744,859 | 2,764,569 | 3,299,871 | 3,352,545 | 4,043,314 | 3,508,200 | 4,096,595 | 42,793,383 |

[a] Compiled from Monthly Reports, Illinois State Department of Mines and Minerals.
[b] Included under "Other Counties."

TABLE 4.—*Distribution of coal produced in Illinois in 1917, 1918, and 1929* [a]

| Distribution | Net Tons | | |
|---|---|---|---|
| | 1917 | 1918 | 1929 |
| Used in Illinois: | | | |
| Used at mines for power and heat | 2,374,250 | 2,381,197 | 953,932 |
| Sold to local trade, not shipped | 3,541,792 | 3,641,044 | 3,991,337 |
| Shipped to Illinois points: | | | |
| Chicago District | (b) | (b) | 9,120,428 |
| Illinois, Other | 25,780,675 | 31,405,464 | 14,027,684 |
| | 31,696,717 | 37,427,705 | 28,093,381 |
| Shipped to other States: | | | |
| Alabama | ..... | 20,719 | ..... |
| Arkansas | 96,000 | 267,628 | 39,284 |
| Indiana, Other | 2,255,000 | 2,410,432 | 684,705 |
| Iowa | 4,026,000 | 3,597,048 | 2,815,630 |
| Kansas | 107,000 | 46,767 | 137,299 |
| Kentucky | 18,000 | 14,306 | ..... |
| Louisiana | 102,000 | 86,112 | 3,975 |
| Michigan | 706,000 | 983,572 | 34,568 |
| Minnesota | 1,801,000 | 1,967,926 | 767,781 |
| Mississippi | 55,000 | 22,954 | 5,779 |
| Missouri | 6,806,000 | 6,830,419 | 5,884,713 |
| Nebraska | 661,000 | 185,946 | 596,666 |
| North Dakota | 43,000 | 7,820 | 2,799 |
| Ohio | 63,000 | 16,000 | ..... |
| South Dakota | 231,000 | 228,160 | 172,048 |
| Tennessee | 50,000 | 210,128 | 30,580 |
| Texas | 63,000 | 322 | ..... |
| Wisconsin | 1,936,000 | 2,486,254 | 846,811 |
| Miscellaneous | ..... | ..... | 11,595 |
| | 19,019,000 | 19,382,513 | 12,034,233 |
| Railroad fuel delivered by all-rail routes: | | | |
| To originating railroad (non-revenue freight) | 35,431,220 | 32,370,362 | 16,073,069 |
| To other railroads (revenue freight) | ..... | ..... | 4,046,286 |
| Shipped to tidewater | 2,450 | 15,400 | ..... |
| Exported by rail | 50,000 | 95,125 | ..... |
| Grand Total | 86,199,387 | 89,291,105 | 60,246,969 |

[a] From Supplement to Monthly Coal Distribution: U. S. Bureau of Mines Report No. 4, Nov. 20, 1931.

[b] Included in "Illinois, Other" and "Indiana, Other."

## MARKET LOSSES

The decline in consumption of Illinois coal from 86 and 89 million tons in 1917 and 1918 to 60 million tons in 1929 is the result of many complex economic factors operating in this intervening period. The principal market losses to be noted are: (1) in coal shipped to points within the State; (2) in coal exported to Iowa, Michigan, Minnesota, Wisconsin, and

states to the south and southwest, notably Missouri, Louisiana, Texas, and Mississippi; (3) in coal consumed by railroads, and (4) in coal used at mines.

*Market losses within the State.*—Decreased consumption of Illinois coal within the State has occurred principally in the Chicago market. The chief competition for the coal market in the Chicago district has come from the Kanawha, Logan, Kenova-Thacker, New River-Winding Gulf, and Pocahontas-Tug River districts in West Virginia, the Hazard and McRoberts districts in northeastern Kentucky, and southwestern Virginia.

*Losses in states bordering Illinois.*—The substantial decrease in shipments to Michigan, Wisconsin, and Minnesota reflect the gradually increasing shipments of coal over the lakes from the Appalachian fields. Toward the south and southwest, in the states of Missouri, Arkansas, Louisiana, Mississippi, and Texas, the outlet for Illinois coal has been curtailed by the invasion of fuel oil and natural gas in the fuel markets of the southwest.

*Railway fuel market losses.*—The Illinois coal industry has suffered severe loss in the railroad coal market but the decline in coal purchased by railroads has not been altogether due to purchases of coal from fields outside of Illinois. Two other factors are (1) the use of fuel oil, and (2) the remarkable increase in the efficiency of fuel consumption during the period from 1917 to 1929 so that, in spite of an increasing freight traffic, the consumption of fuel has steadily declined. In order to show the changes that have occurred in the consumption of railroad fuel in the past twelve years, Table 5 has been prepared showing consumption of fuel (both coal and oil), coal purchased by railroads from Illinois mines, and the percentage of decline for Illinois fields and for the United States as a whole.

Changes in railroad consumption alone account for a decline of nearly 14 million tons in Illinois coal production. Another principal factor in the decline, in addition to the increasing efficiency in fuel consumption by railroads, has been the rise of other coal fields in the railroad fuel market, notably the Fairmont, Kanawha, and Kenova-Thacker in West Virginia and the fields of eastern and western Kentucky. Competition of fuel oil has been less significant to the Illinois coal industry. The principal area of fuel oil consumption by railroads is in the Southwest and portions of the Central West regions into which Illinois coal does not move in large quantities. Moreover, the consumption of fuel oil by railroads has become stabilized since 1924 and is no longer responsible for further decreases in coal consumption by railroads.

TABLE 5.—*Fuel consumption by railroads, 1917–1931* [a]
(In thousands of tons)

| Year | Coal Consumption | Fuel Oil Consumption (Coal equivalent) | Total Fuel Consumption | Coal Purchased from Illinois fields | Percent of Railroad Fuel Purchased from Illinois |
|---|---|---|---|---|---|
| 1917 | 138,714 | 10,700 | 149,414 | 33,697 | 24.3 |
| 1918 | 137,830 | 9,770 | 147,600 | [b] | .... |
| 1919 | 122,674 | 9,440 | 132,114 | [b] | .... |
| 1920 | 131,553 | 11,500 | 143,053 | [b] | .... |
| 1921 | 110,554 | 9,900 | 120,454 | [b] | .... |
| 1922 | 115,636 | 10,850 | 126,486 | [b] | .... |
| 1923 | 134,106 | 13,850 | 147,956 | [b] | .... |
| 1924 | 119,926 | 14,700 | 134,626 | [b] | .... |
| 1925 | 119,888 | 14,600 | 134,488 | [b] | .... |
| 1926 | 124,828 | 14,650 | 139,478 | [b] | .... |
| 1927 | 117,486 | 14,450 | 131,936 | [b] | .... |
| 1928 | 113,882 | 14,850 | 128,732 | [b] | .... |
| 1929 | 112,951 | 14,550 | 127,501 | 19,910 | 17.6 |
| 1930 | 97,857 | 14,502 | 112,359 | ..... | .... |
| 1931 | [c]82,000 | [c]12,375 | 94,375 | ..... | .... |

[a] Annual Report on Fuel for Locomotives, Statement M-230: Interstate Commerce Commission.
Monthly Coal Distribution Report No. 8: U. S. Bureau of Mines, March, 1932.
[b] Data not available.
[c] Estimated on a basis of 11 months' consumption.

*Decrease in coal used at mines.*—The decline in the quantity of coal used at mines is explained, in part, by the decreased output of coal since 1917, and in part by the increased use of electrical power which has accompanied mechanized mining.

IMPORTED COAL

*Total coal consumed in the Illinois coal market area.*—The quantity and source of coal that entered the Illinois coal market area in 1917 and 1929 is shown in Tables 6 and 7. In 1917 Illinois supplied 47,229,000 tons or 60 per cent of all coal consumed, whereas in 1929, the contribution of Illinois had fallen to 39,181,000 tons or 46 per cent of the total coal consumption. In this intervening period Western Kentucky increased its shipments into the Illinois coal market area from 873,000 tons to 4,694,000; Hazard from 197,000 to 1,037,000; Southeast Kentucky and Harlan-Benham from 855,000 to 4,651,000 and New River-Winding Gulf from 535,000 to 6,312,000 tons. Less important increases were registered by other eastern fields.

TABLE 6.—*Origin and amount of coal shipped into the Illinois coal market area, 1917* [a]

(In thousands of tons)

| State or Field of Origin | Illinois[b] | Iowa | Missouri | Nebraska | Wisconsin | Minnesota | Dakotas | Total |
|---|---|---|---|---|---|---|---|---|
| Illinois | 31,696 | 4,026 | 6,808 | 661 | 1,963 | 1,801 | 274 | 47,229 |
| Indiana | 5,165 | ..... | 54 | 9 | 564 | 199 | 18 | 6,009 |
| Western Kentucky | 447 | 63 | 214 | 36 | 110 | ..... | 3 | 873 |
| Kanawha, Logan, Kenova-Thacker | 1,440 | 165 | 20 | 6 | 963 | 60 | 15 | 2,669 |
| Northeastern Kentucky, McRoberts | 1,328 | 198 | 270 | 45 | 25 | 195 | 60 | 2,121 |
| Hazard | 197 | ..... | ..... | ..... | ..... | ..... | ..... | 197 |
| Southeastern Kentucky, Harlan-Benham | 656 | 45 | 22 | ..... | 66 | 42 | 24 | 855 |
| Virginia | 189 | ..... | ..... | ..... | ..... | ..... | ..... | 189 |
| Central Pennsylvania | 77 | ..... | ..... | ..... | ..... | ..... | ..... | 77 |
| Somerset-Meyersdale and Cumberland-Piedmont | 16 | ..... | 10 | ..... | ..... | ..... | ..... | 26 |
| New River-Winding Gulf | 535 | ..... | ..... | ..... | ..... | ..... | ..... | 535 |
| Pocahontas-Tug River | 4,597 | ..... | 102 | ..... | 345 | ..... | ..... | 5,044 |
| Western Pennsylvania and West Virginia Panhandle | 55 | ..... | ..... | ..... | 18 | ..... | ..... | 73 |
| Northern West Virginia | 30 | ..... | ..... | ..... | ..... | ..... | ..... | 30 |
| Ohio | 90 | ..... | ..... | ..... | 35 | 50 | ..... | 175 |
| West of Mississippi River | 20 | 4,431 | 4,507 | 2,650 | ..... | 37 | 1,101 | 12,746 |
| Total | 46,538 | 8,928 | 12,007 | 3,407 | 4,089 | 2,384 | 1.495 | 78,848 |

[a] Supplements to Monthly Coal Distribution Reports Nos. 1, 3, 4, and 6: U. S. Bureau of Mines, Aug., Oct., Nov., 1931, and Jan., 1932.
[b] Includes shipments to Chicago district lying in the State of Indiana.

TABLE 7.—*Origin and amount of coal shipped into the Illinois coal market area, 1929* [a]

(In thousands of tons)

| State or Field of Origin | Illinois (total) | Chicago District | Iowa | Missouri | Nebraska | Wisconsin | Minnesota | Dakotas | Total |
|---|---|---|---|---|---|---|---|---|---|
| Illinois | 28,093 | 9,120 | 2,816 | 5,885 | 597 | 847 | 768 | 175 | 39,181 |
| Indiana | 4,545 | 3,465 | 483 | 86 | 27 | 309 | 39 | 6 | 5,495 |
| Western Kentucky | 2,343 | 925 | 941 | 636 | 120 | 411 | 192 | 51 | 4,694 |
| Kanawha, Logan, Kenova-Thacker | 2,276 | 1,756 | 484 | 57 | 6 | 104 | 50 | ..... | 2,977 |
| Northeastern Kentucky, McRoberts | 2,063 | 1,678 | 335 | 219 | 3 | 109 | 98 | 25 | 2,852 |
| Hazard | 697 | 259 | 295 | 2 | 1 | 22 | 17 | 3 | 1,037 |
| Southeastern Kentucky, Harlan-Benham, Tennessee | 4,070 | 3,679 | 437 | 17 | 7 | 44 | 55 | 21 | 4,651 |
| Virginia | 174 | 57 | 71 | 1 | ..... | 21 | 18 | 2 | 287 |
| Central Pennsylvania | 20 | 12 | 3 | 5 | 2 | 2 | 1 | ..... | 33 |
| Somerset-Meyersdale and Cumberland-Piedmont | 32 | 23 | 1 | 2 | ..... | 4 | 3 | ..... | 42 |
| New River-Winding Gulf | 5,649 | 5,206 | 84 | 97 | 1 | 337 | 132 | 12 | 6,312 |
| Pocahontas-Tug River | 6,039 | 5,666 | 67 | 7 | ..... | 392 | 97 | 24 | 6,626 |
| Western Pennsylvania, W. Virginia Panhandle | 312 | 310 | ..... | ..... | ..... | 4 | ..... | ..... | 316 |
| Northern West Virginia | 79 | 67 | 11 | ..... | ..... | 6 | 4 | 2 | 102 |
| Ohio | 26 | ..... | ..... | ..... | ..... | 10 | ..... | ..... | 36 |
| West of Mississippi River | 4 | ..... | 1,887 | 3,131 | 2,825 | 1 | 181 | 1,828 | 9,857 |
| Total | 56,422 | 32,223 | 7,915 | 10,145 | 3,589 | 2,623 | 1,655 | 2,149 | 84,498 |

[a] Supplements to Monthly Coal Distribution Reports Nos. 1, 3, 4, and 6: U. S. Bureau of Mines, Aug., Oct., Nov., 1931, and Jan., 1932.

*Coal consumed in the Chicago market.*—An important factor in the increased consumption of eastern coal is the Chicago market area. This market in 1929 consumed about 32,000,000 tons of coal of which Illinois supplied about 29 per cent, Indiana about 11 per cent, and the Appalachian fields most of the remainder, or about 60 per cent. Although consumption figures for this area are not separately available for 1917, an examination of Tables 6 and 7 discloses the relation of the Chicago market to the increased importation from eastern fields since this year. For example, in 1929, the principal contributors to the Chicago market—Harlan-Benham, New River-Winding Gulf and Pocahontas-Tug River fields—supplied 14,551,000 tons to this district whereas in 1917 their contribution to the entire Illinois coal market area was 5,788,000 tons.

Coal imported into the Chicago area is used primarily (1) in the manufacture of by-product coke, (2) in the manufacture of gas, and (3) as a domestic fuel.

The 12 to 13 million tons of Appalachian coals coked each year in the Chicago area constitute about 85 per cent of the by-product coke industry of Illinois and Indiana which in 1929 absorbed about 14.7 million tons of coal. Coals for coking are obtained mainly from the Harlan and McRoberts fields in eastern Kentucky, and Kanawha, Logan, Pocahontas, New River, and Winding Gulf fields of West Virginia.

*Coal consumed in the Lake Dock territory.*—The Lake Dock market territory comprises the states of Wisconsin, Minnesota, the eastern Dakotas, and northern Iowa. The competitive condition in this territory is governed largely by the low water rates over the Great Lakes from the Appalachian coal fields ranging from 35 to 50 cents per ton in recent years.

TABLE 8.—*Distribution of lake dock bituminous coal, 1917 and 1929* [a]
*(Exclusive of railroad and bunker fuel)*
(In net tons)

| Distribution | 1929 | | | 1917 Total |
|---|---|---|---|---|
| | Lake Superior Docks | Lake Michigan Docks | Total | |
| Wisconsin | 972,440 | 6,230,242 | 7,202,682 | 4,484,768 |
| Minnesota | 6,810,443 | 32,160 | 6,842,603 | 4,151,132 |
| North Dakota | 430,092 | 562 | 430,654 | 618,131 |
| South Dakota | 489,797 | 4,972 | 494,769 | 477,961 |
| Chicago District | ..... | 5,100,122 | 5,100,122 | [b] |
| Illinois, other | 182 | 267,609 | 267,791 | 1,050,221 |
| Indiana, other | ..... | ..... | ..... | 562,850 |
| Michigan | 1,319,421 | 4,478,805 | 5,798,226 | 2,726,931 |
| Iowa | 56,081 | 28,014 | 84,095 | 271,560 |
| Total | 10,078,456 | 16,142,486 | 26,220,942 | 14,343,554 |

[a] Supplement to Monthly Coal Distribution Report No. 3: U. S. Bureau of Mines, Oct., 1931.
[b] Included in "Illinois, other," and "Indiana, other."

An examination of Table 8 shows a rapid growth in the coal markets of the lake ports and a decline in the markets of the interior. The larger part of this coal is shipped to commercial docks during the summer season and is placed in storage. Much of it probably enters the domestic trade. No public survey of the fuel requirements of the domestic market have been made for this area, although such a study is much needed.

*Coal consumed west of Mississippi River.*—Table 9 shows the quantity of coal shipped into seven states west of the Mississippi River from Illinois and from the fields of the Western Interior and Rocky Mountain coal provinces together with the percentage supplied by Illinois. The coal industry of Illinois meets its principal competition in this territory from local fields within the states themselves. Imports of coal from fields outside of the Illinois coal market area into the southwestern and Rocky Mountain coal fields totalled 4,442,179 tons, or 18 per cent of the coal consumed in the area comprising these seven states. Illinois supplied 42 per cent of this market and the remainder, 40 per cent, was produced and consumed locally.

Competition from coal fields of the Rocky Mountain states is heaviest in Kansas, Nebraska, and the Dakotas (Table 9). These states constitute the dividing zone between eastward and westward shipments of coal. In spite of a considerable local industry, Iowa and Missouri import substantial quantities of Illinois coal, in fact, they depend mainly on this state for their outside needs. The wide distribution of relatively small quantities of Arkansas coal over this area is accounted for by the demand for "Arkansas anthracite" for domestic heating use which probably explains the shrinking market for Pennsylvania anthracite in these states.

## DISTRIBUTION IN 1930-1931

The detailed distribution figures given above indicate some of the underlying economic factors which govern the coal movements in the Illinois coal market area. These detailed data are available for 1929 only, but the underlying conditions have not changed appreciably. The consumption of coal in the Illinois coal market area in 1930 and 1931 together with the quantity supplied by Illinois can be approximated by a summation of the quantities of coal moved in by water and rail from competing fields on the west and east. The coal supplies furnished to the Illinois fuel area in 1930 and 1931 are summarized in Table 10.

The "total approximate supply" includes the quantity of coal produced in the area and the imported quantities which can be definitely traced. In addition to this, a considerable quantity of coal is imported from the nearby fields of Indiana, Western Kentucky, and Arkansas.

TABLE 9.—*Coal marketed in six states west of Mississippi River, 1929* [a]
*(Exclusive of railroad fuel)*
(In net tons)

| Producing State | Iowa | Missouri | Kansas | Nebraska | Minnesota | Dakotas | Total |
|---|---|---|---|---|---|---|---|
| Illinois | 2,815,630 | 5,884,713 | 137,299 | 596,666 | 767,781 | 174,847 | 10,376,936 |
| Arkansas | 76,534 | 333,880 | 190,028 | 269,163 | 96,881 | 10,503 | 976,989 |
| Colorado | 15,670 | 1,108 | 525,908 | 866,495 | 677 | 50,050 | 1,459,908 |
| Iowa | 2,561,583 | 190,478 | 3,639 | 4,235 | 2,920 | ..... | 2,762,855 |
| Kansas and Missouri | 26,182 | 2,872,065 | 1,443,442 | 842,757 | 654 | 82 | 5,185,182 |
| Montana | 2,756 | ..... | ..... | 313 | 8,078 | 150,010 | 161,157 |
| New Mexico | ..... | 594 | 48,319 | 6,223 | ..... | ..... | 55,136 |
| North Dakota | 29 | ..... | ..... | ..... | 37,546 | 1,822,908 | 1,860,483 |
| Oklahoma | 41,701 | 244,271 | 350,060 | 211,307 | 32,133 | 4,215 | 883,687 |
| Utah | 84 | ..... | 24,001 | 35,524 | ..... | ..... | 59,609 |
| Wyoming | 20,362 | 2,752 | 21,412 | 588,859 | 2,568 | 209,740 | 845,693 |
| Total | 5,560,531 | 9,529,861 | 2,744,108 | 3,421,542 | 949,238 | 2,422,355 | 24,627,635 |
| Percentage supplied by Illinois | 50.5 | 61.6 | 5.0 | 17.4 | 80.8 | 7.2 | 42.0 |

[a] Supplements to Monthly Coal Distribution Reports Nos. 1 and 4: U. S. Bureau of Mines, Aug. and Nov., 1931.

TABLE 10.—*Summary of coal tonnages available to the Illinois coal market area, 1930 and 1931* [a]
(In thousands of net tons)

| Source of Coal | 1930 | 1931[b] |
|---|---|---|
| Illinois production | 51,719 | 42,793 |
| Production from other states (also consumed in the Illinois fuel area) | | |
| Iowa | 3,893 | 3,305 |
| Kansas | 2,430 | 1,995 |
| Missouri | 3,853 | 3,369 |
| North Dakota | 1,700 | 1,610 |
| Shipments into the area | | |
| By water to Lake Superior docks and "Soo" | 13,723 | 10,171 |
| By water to Lake Michigan ports | 10,056 | 9,216 |
| By car ferry across Lake Michigan | 1,035 | 684 |
| By rail to Illinois-Indiana [c] | 22,930 | 15,890 |
| By rail to Northwest | 4,260 | 3,099 |
| Colorado-South Wyoming shipments eastward | 992 | 562 |
| Total approximate supply | 116,591 | 92,594 |
| Production from nearby states | | |
| Indiana | 16,490 | 13,310 |
| Western Kentucky | 10,915 | 8,343 |
| Arkansas | 1,533 | 1,238 |

[a] Compiled from Monthly Coal Distribution Reports: U. S. Bureau of Mines.
[b] Preliminary figures.
[c] Mainly the Chicago area.

Indiana coal finds a considerable outlet into the market territory that is served by the Illinois producers. Although these figures have not been separated for 1930 and 1931, the distribution of Indiana coal in the Illinois fuel market area in 1929 was as follows:

| | Millions of tons |
|---|---|
| To the Chicago district | 3.46 |
| To other Illinois destinations | 1.08 |
| To other states in the market area [7] | 0.95 |

[7] Iowa, Kansas, Minnesota, Missouri, North Dakota, South Dakota, and Wisconsin.

Western Kentucky coal has only a limited market in the Chicago district but finds an even wider market than Indiana coal in other parts of the Illinois fuel area. The distribution in 1929 was as follows:

| | Millions of tons |
|---|---|
| To Chicago district | 0.92 |
| To other Illinois destinations | 1.41 |
| To other states in market area | 2.35 |
| Total | 4.68 |

Tables 11 and 12 give more detailed information of coal movements into the Illinois coal market area.

TABLE 11.—*Coal imported into Illinois coal market area, 1930–1931* [a]
(In thousands of tons)

| 1930 | Lake borne coal arriving at | | | Rail haul from Appalachian fields to | | Colorado-So. Wyoming | Total |
|---|---|---|---|---|---|---|---|
| | Lake Superior and Soo | Lake Michigan ports | By car-ferry across Lake Michigan | Illinois-Indiana | Northwest | Shipments East | |
| Jan. Feb. Mar. Apr. | 638 | 657 | 330 | 9,158 | 1,341 | 376 | 12,500 |
| May | 2,812 | 1,849 | 60 | 1,450 | 225 | 44 | 6,440 |
| June | 2,529 | 1,695 | 64 | 1,475 | 233 | 38 | 6.034 |
| July | 2,209 | 1,831 | 80 | 1,419 | 306 | 56 | 5,901 |
| Aug. | 1,840 | 1,641 | 102 | 1,789 | 475 | 47 | 5,894 |
| Sept. | 1,579 | 1,571 | 103 | 1,801 | 514 | 95 | 5,663 |
| Oct. | 1,312 | 1,539 | 109 | 2,029 | 523 | 143 | 5,655 |
| Nov. | 804 | 1,268 | 102 | 1,796 | 375 | 82 | 4,427 |
| Dec. | 0 | 5 | 85 | 2,013 | 268 | 111 | 2,482 |
| Total | 13,723 | 12,056 | 1,035 | 22,930 | 4,260 | 992 | 54,996 |
| 1931 | | | | | | | |
| Jan. Feb. Mar. Apr. | 346 | 283 | 209 | 6,804 | 892 | 178 | 8,712 |
| May | 955 | 1,038 | 54 | 1,252 | 237 | 32 | 3,568 |
| June | 1,337 | 1,291 | 62 | 1,045 | 237 | 24 | 3,996 |
| July | 1,599 | 1,599 | 67 | 1,093 | 307 | 21 | 4.686 |
| Aug. | 1,923 | 1,603 | 80 | 1,393 | 393 | 54 | 5,446 |
| Sept. | 1,669 | 1,303 | 79 | 1,490 | 386 | 72 | 4,999 |
| Oct. | 1,620 | 1,273 | 76 | 1,561 | 379 | 94 | 5,003 |
| Nov. | 719 | 820 | 57 | 1,252 | 268 | 87 | 3,203 |
| Dec. | 3 | 6 | 0 | 1,392 | 273 | 68 | 1,742 |
| Total | 10,171 | 9,216 | 684 | 17,282 | 3,372 | 630 | 41,355 |

[a] Compiled from Monthly Coal Distribution Reports Nos. 1–8: U. S. Bureau of Mines, Aug.–Dec., 1931, Jan.–March, 1932.

TABLE 12.—*Coal available in the Illinois coal market area, 1930–1931* [a]
(In thousands of tons)

| Month | Production of states in the area | | | | | Production of states which ship into the Illinois market area | | |
|---|---|---|---|---|---|---|---|---|
| | Illinois | Iowa | Missouri | Kansas | North Dakota | Indiana | Western Kentucky | Arkansas |
| (1930) | | | | | | | | |
| Jan. | 6,590 | 535 | 461 | 303 | 278 | 1,894 | 1,506 | 232 |
| Feb. | 4,762 | 356 | 367 | 261 | 162 | 1,575 | 1,095 | 148 |
| Mar. | 4,128 | 315 | 303 | 163 | 124 | 1,375 | 913 | 54 |
| Apr. | 3,662 | 266 | 285 | 144 | 60 | 1,243 | 742 | 53 |
| May | 3,334 | 230 | 253 | 128 | 53 | 1,161 | 705 | 50 |
| June | 3,026 | 224 | 253 | 117 | 54 | 1,029 | 680 | 63 |
| July | 3,268 | 216 | 284 | 140 | 51 | 1,055 | 724 | 89 |
| Aug. | 3,633 | 251 | 317 | 148 | 61 | 1,192 | 811 | 111 |
| Sept. | 3,983 | 308 | 302 | 207 | 145 | 1,322 | 919 | 171 |
| Oct. | 5,234 | 410 | 362 | 273 | 293 | 1,564 | 977 | 229 |
| Nov. | 4,759 | 342 | 314 | 239 | 230 | 1,460 | 840 | 155 |
| Dec. | 5,340 | 440 | 352 | 307 | 189 | 1,640 | 1,003 | 178 |
| Total | 51,719 | 3,893 | 3,853 | 2,430 | 1,700 | 16,490 | 10,915 | 1,533 |
| (1931) [b] | | | | | | | | |
| Jan. | 4,918 | 380 | 315 | 246 | 177 | 1,515 | 957 | 154 |
| Feb. | 3,796 | 284 | 228 | 162 | 124 | 1,187 | 722 | 62 |
| Mar. | 4,291 | 351 | 277 | 185 | 131 | 1,392 | 812 | 67 |
| Apr. | 3,029 | 232 | 233 | 137 | 90 | 988 | 590 | 50 |
| May | 2,949 | 217 | 197 | 124 | 79 | 984 | 550 | 36 |
| June | 2,745 | 226 | 184 | 117 | 83 | 943 | 523 | 46 |
| July | 2,765 | 198 | 250 | 138 | 86 | 871 | 510 | 64 |
| Aug. | 3,300 | 204 | 241 | 133 | 101 | 929 | 640 | 100 |
| Sept. | 3,352 | 248 | 257 | 168 | 144 | 1,014 | 710 | 152 |
| Oct. | 4,043 | 330 | 343 | 183 | 192 | 1,212 | 825 | 247 |
| Nov. | 3,508 | 287 | 363 | 174 | 195 | 1,045 | 696 | 138 |
| Dec. | 4,097 | 348 | 381 | 228 | 208 | 1,230 | 810 | 122 |
| Total | 42,793 | 3,305 | 3,269 | 1,995 | 1,610 | 13,310 | 8,343 | 1,238 |

[a] Data for Illinois from Illinois State Department of Mines and Minerals; data for other states compiled from U. S. Bureau of Mines Coal Distribution Reports.
[b] Preliminary figures.

## Influence of Competitive Fuels and Water Power

Coal shares the energy market with fuel oil, natural gas, gasoline, and water power. Of these fuel oil is the most important factor in the Illinois coal market area, natural gas has just recently entered the market, water power is a minor but not unimportant factor, and gasoline is making itself felt as a direct competitor of coal.

### FUEL-OIL CONSUMPTION

The extent to which fuel oil shares the energy market in the states supplied by Illinois coal is shown in Table 13.

Table 13.—*Fuel oil consumption in the Illinois coal market area, 1926–1930* [a]
(In barrels of 42 U. S. gallons)

| State | 1926 | 1927 | 1928 | 1929 | 1930 |
|---|---|---|---|---|---|
| Illinois | 8,992,051 | 11,445,021 | 14,127,611 | 13,425,030 | 12,627,298 |
| Iowa | 666,153 | 659,790 | 786,897 | 881,970 | 1,105,538 |
| Minnesota | 979,585 | 1,404,070 | 1,478,911 | 1,478,911 | 1,548,860 |
| Missouri | 5,146,747 | 5,296,509 | 4,516,311 | 5,020,376 | 4,468,199 |
| North Dakota | 40,182 | 25,070 | 63,202 | 109,655 | 128,201 |
| South Dakota | 121,909 | 106,046 | 130,332 | 154,290 | 154,886 |
| Wisconsin | 1,104,141 | 1,411,161 | 1,474,385 | 1,640,396 | 1,567,486 |
| Total | 17,050,768 | 20,347,667 | 22,577,659 | 22,780,577 | 21,625,235 |
| Coal equivalent (in tons) [b] | 4,050,000 | 4,835,000 | 5,370,000 | 5,710,000 | 5,150,000 |

[a] Swanson, E. B., Distribution of Fuel Oil in 1930, U. S. Bureau of Mines.
[b] Fuel oil converted into coal-equivalent on a basis of 4.2 barrels of oil to a ton of coal.

Although the total figure for 1930 is less than for 1929, the percentage decrease of 5.1 per cent is less than the percentage decrease of coal consumed in the Illinois coal market area for the same period.

### NATURAL GAS CONSUMPTION

The introduction of natural gas into the Chicago and East St. Louis areas and into numerous cities in the interior of Illinois, as well as an extensive natural gas pipe-line development in Missouri, Iowa, eastern Nebraska, and Minnesota, has brought a new and undetermined element into the Illinois coal market territory. In the Chicago area, natural gas has been substituted partly for manufactured gas in domestic heating and it will probably find new markets in the electric utilities and in certain types of industries. In this locality, it is probable that Appalachian coals will be the chief ones to be displaced by gas. In the interior cities of Illinois and in Missouri, Iowa, and eastern Nebraska, the competition will be more directly with Illinois coal. The rapidly changing conditions in the natural

gas industry since 1929 make it impossible at this time to evaluate the full significance of this new competitor.

### WATER POWER

Modern water power developments are confined mainly to the production of electrical energy in public utilities and, as such, permit of a reasonably accurate measurement of the extent to which this form of energy displaces coal. The measurement is made by calculating the amount of coal which would be required to produce the electrical energy now generated by water power.

Since the efficiency of steam-generated electrical energy has been increasing yearly, as indicated by the decreasing quantities of coal required for the production of a unit of electrical energy, the displacement value of water power becomes less significant each succeeding year. Hence Table 14 has been prepared in which the hydro-electric power output for each year is shown converted into equivalent tons of coal, the calculation being based on the amount of coal required to produce a kilowatt-hour of electrical energy each successive year.

TABLE 14.—*Coal-equivalent of hydro-electric power production, 1920–1931* [a]

| Year | Hydro-electric power[b] output in K. W. Hrs. (in thousands) | Pounds of coal per K. W. Hrs. | Coal-equivalent (in thousands of tons) |
|---|---|---|---|
| 1920 | 1,814,106 | 3.0 | 2,721 |
| 1921 | 1,738,413 | 2.7 | 2,350 |
| 1922 | 1,738,895 | 2.5 | 2,175 |
| 1923 | 1,819,802 | 2.4 | 2,190 |
| 1924 | 2,121,735 | 2.2 | 2,330 |
| 1925 | 2,132,361 | 2.1 | 2,240 |
| 1926 | 2,609,474 | 1.95 | 2,530 |
| 1927 | 2,848,628 | 1.84 | 2,625 |
| 1928 | 3,074,376 | 1.76 | 2,700 |
| 1929 | 2,814,435 | 1.69 | 2,388 |
| 1930 | 2,534,058 | 1.62 | 2,050 |
| 1931 | 2,405,837 | 1.55 | 1,860 |

[a] U. S. Geol. Survey Water Supply Paper 579, Table 43; and Monthly Report of Electric Power Production, Division of Power Resources, U. S. Geol. Survey.
[b] For Illinois, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas.

### GASOLINE

The competition of gasoline with coal is less direct and consequently is usually underestimated; indeed it is difficult to estimate accurately. The internal combustion engine, particularly in the automobile, is the dominant factor. Although in its early period of development the automobile was primarily a pleasure vehicle, now it is used in very large numbers for commercial transportation. The automobile has become a serious competitor of steam and electric railroads. Numerous interurban electric

lines have been abandoned. Freight and passenger traffic on railroads has been especially affected in the short haul movements in regions of dense population.

## Mine Mechanization and Mechanical Loading in Illinois Mines

Mine mechanization is here broadly defined to include the use of power in mechanical or electric haulage, machine cutting, power drilling, mechanical loading, and coal preparation. Machine cutting, power drilling, coal preparation and electric haulage have been important since 1913. Hoisting and tipple operations have been largely electrified, underground electric locomotives are widely used for hauling, and machine cutting has shown a definite upward trend in displacing hand mining or "shooting from the solid". From 50 per cent of the total production in 1913, the output by mechanical methods has risen to more than 80 per cent in 1931, and electric cutting machines have almost completely displaced air-driven machines. With power supply available at the working face of the mine, the use of the electric drill is rapidly being introduced.

Mechanical loading is the latest application of mechanization to the coal industry, and, in spite of the calamitous conditions of the industry in 1931, the percentage loaded mechanically increased substantially over that of 1930. In Illinois the total output by all methods in 1931 was 8,923,876 tons less than the 1930 output. According to Coal Age,[8] mechanical output dropped only 223,817 tons from 1930 to 1931—23,342,932 tons in 1930, 23,119,115 tons in 1931—whereas hand methods showed a loss of 8,702,059 tons.

## Strip Mining in 1931

The production of coal by strip mining in 1931 showed a slight gain above that of 1930 and exceeded that of 1929 (Table 15). The output of coal by stripping in Illinois has increased from 1.6 per cent of the total production in 1923 to 14.6 per cent in 1931. Although 1931 was a "depression" year, the tonnage of strip mined coal was the highest recorded thus far in any year. The same trend is apparent in all other states using this method of coal recovery.

Strip mines showed less fluctuation in output from month to month than the shaft mines, as shown in Table 16. The production of a ton of coal in Illinois strip mines requires but 0.52 man-hour, in shaft mines, 1.51 man-hours. The strip mines in Illinois therefore operate with but 34 per cent as much labor per ton of coal produced as do the underground mines. Other factors, such as capital costs, increasing depth of overburden in areas remaining to be worked, changing costs of materials, etc. are to be considered in the larger economics of the question.

[8] Coal Age, vol. 37, No. 2, February, 1932, p. 61.

TABLE 15.—*Strip mined coal in Illinois, 1914–1931* [a]

| Year | Output | Per cent of total production | Year | Output | Per cent of total production |
|---|---|---|---|---|---|
| 1914 | 327,487 | 0.6 | 1923 | 1,256,704 | 1.6 |
| 1915 | 455,195 | 0.8 | 1924 | 2,219,318 | 3.2 |
| 1916 | 437,863 | 0.7 | 1925 | 3,378,747 | 5.0 |
| 1917 | 519,944 | 0.6 | 1926 | 3,443,668 | 4.9 |
| 1918 | 512,428 | 0.6 | 1927 | 2,807,363 | 6.0 |
| 1919 | 400,640 | 0.6 | 1928 | 4,345,762 | 7.7 |
| 1920 | 589,540 | 0.7 | 1929 | 5,374,813 | 8.8 |
| 1921 | 563,168 | 0.8 | 1930 | 6,116,415 | 11.3 |
| 1922 | 677,513 | 1.2 | 1931[b] | 6,262,501 | 14.6 |

[a] Monthly Report of Shipping Mines, Illinois State Dept. of Mines and Minerals.
[b] Preliminary figures.

TABLE 16.—*Index of seasonal variation of coal production in shaft mines and in strip mines* [a]

| 1931 | Production of shaft mines | Index of production Avg. monthly=100 | Production of strip mines | Index of production Avg. monthly=100 |
|---|---|---|---|---|
| January | 4,379,869 | 138 | 538,241 | 103 |
| February | 3,284,510 | 106 | 511,590 | 98 |
| March | 3,734,849 | 121 | 556,658 | 107 |
| April | 2,556,913 | 84 | 471,611 | 90 |
| May | 2,465,239 | 83 | 484,040 | 93 |
| June | 2,265,208 | 77 | 479,651 | 92 |
| July | 2,319,839 | 78 | 444,730 | 85 |
| August | 2,827,982 | 92 | 471,889 | 90 |
| September | 2,868,272 | 94 | 484,276 | 93 |
| October | 3,433,513 | 113 | 609,801 | 117 |
| November | 2,959,116 | 98 | 549,084 | 105 |
| December | 3,435,715 | 115 | 660,880 | 127 |
| Total | 36,531,025 | | 6,262,501 | |
| Monthly average | 3,044,252 | 100 | 521,875 | 100 |

[a] Monthly Report of Shipping Mines, Illinois State Dept. of Mines and Minerals.

## NUMBER AND OUTPUT OF MINES BY CLASSES

Table 17 shows by classes the number of Illinois coal mines in operation, the total output, and the percentage of the total output of each class from 1919 to 1930. Except for the year of 1922, when the labor strike affected the class 1 mines most severely, the trend of production shows an unmistakable drift to the larger mines and away from class 2 and class 3 mines. The persistence of mines in classes 4 and 5 is probably explained by the fact that mines formerly in classes 2 and 3 dropped to classes 4 and 5 in periods of a dull market. All classes of mines have decreased in numbers but classes 2 and 3 show a greater percentage of reduction than any of the other groups.

TABLE 17.—*Number and output, by classes, of coal mines, 1919–1930* [a]

| Year | Class 1A [b] (more than 500,000 tons) | Class 1B [b] (200,000 to 500,000 tons) | Class 2 (100,000 to 200,000 tons) | Class 3 (50,000 to 100,000 tons) | Class 4 (10,000 to 50,000 tons) | Class 5 (less than 10,000 tons) | Total |
|---|---|---|---|---|---|---|---|
| 1919 | 115 | | 77 | 75 | 101 | 330 | 698 |
| 1920 | 166 | | 87 | 53 | 90 | 258 | 654 |
| 1921 | 123 | | 82 | 59 | 116 | 292 | 672 |
| 1922 | 103 | | 91 | 69 | 124 | 378 | 765 |
| 1923 | 134 | | 82 | 64 | 98 | 247 | 625 |
| 1924 | 46 | 60 | 59 | 58 | 88 | 177 | 488 |
| 1925 | 48 | 48 | 45 | 33 | 73 | 219 | 466 |
| 1926 | 48 | 48 | 37 | 39 | 81 | 262 | 515 |
| 1927 | 21 | 52 | 52 | 46 | 88 | 286 | 545 |
| 1928 | 33 | 50 | 40 | 37 | 65 | 322 | 547 |
| 1929 | 43 | 49 | 35 | 34 | 64 | 303 | 528 |
| 1930 | 35 | 48 | 31 | 26 | 70 | 298 | 508 |
| PRODUCTION BY CLASSES (In thousands of tons) | | | | | | | |
| 1919 | 40,775 | | 11,173 | 5,671 | 2,594 | 650 | 60,863 |
| 1920 | 68,988 | | 12,333 | 4,206 | 2,661 | 537 | 88,725 |
| 1921 | 49,602 | | 12,049 | 4,303 | 2,867 | 782 | 69,603 |
| 1922 | 36,725 | | 12,716 | 5,082 | 3,206 | 738 | 58,467 |
| 1923 | 59,354 | | 12,090 | 4,783 | 2,380 | 703 | 79,310 |
| 1924 | 34,357 | 18,691 | 3,247 | 4,361 | 2,085 | 582 | 68,323 |
| 1925 | 40,031 | 15,144 | 6,622 | 2,537 | 1,875 | 701 | 66,909 |
| 1926 | 43,394 | 14,736 | 5,573 | 2,909 | 2,014 | 742 | 69,367 |
| 1927 | 15,313 | 17,214 | 7,684 | 3,475 | 2,372 | 789 | 46,848 |
| 1928 | 28,029 | 16,718 | 6,039 | 2,724 | 1,547 | 892 | 55,948 |
| 1929 | 34,830 | 16,130 | 5,033 | 2,330 | 1,523 | 812 | 60,658 |
| 1930 | 28,600 | 16,220 | 4,320 | 1,830 | 1,890 | 870 | 53,730 |

TABLE 17.—(Continued)

| Year | Class 1A[b] (more than 500,000 tons) | Class 1B[b] (200,000 to 500,000 tons) | Class 2 (100,000 to 200,000 tons) | Class 3 (50,000 to 100,000 tons) | Class 4 (10,000 to 50,000 tons) | Class 5 (less than 10,000 tons) | Total |
|---|---|---|---|---|---|---|---|
| PERCENTAGE OF OUTPUT BY CLASSES | | | | | | | |
| 1919 | 67.0 | | 18.4 | 9.3 | 4.2 | 1.1 | 100 |
| 1920 | 77.8 | | 13.9 | 4.7 | 3.0 | 0.6 | 100 |
| 1921 | 71.3 | | 17.3 | 6.2 | 4.1 | 1.1 | 100 |
| 1922 | 62.8 | | 21.7 | 8.7 | 5.5 | 1.3 | 100 |
| 1923 | 74.8 | | 15.2 | 6.1 | 3.0 | 0.9 | 100 |
| 1924 | 50.3 | 27.4 | 12.1 | 6.4 | 3.0 | 0.8 | 100 |
| 1925 | 59.8 | 22.6 | 9.9 | 3.8 | 2.8 | 1.1 | 100 |
| 1926 | 62.6 | 21.2 | 8.0 | 4.2 | 2.9 | 1.1 | 100 |
| 1927 | 32.7 | 36.7 | 16.4 | 7.4 | 5.1 | 1.7 | 100 |
| 1928 | 50.1 | 29.9 | 10.8 | 4.9 | 2.7 | 1.6 | 100 |
| 1929 | 57.4 | 26.6 | 8.3 | 3.9 | 2.5 | 1.3 | 100 |
| 1930 | 53.3 | 30.2 | 8.0 | 3.4 | 3.5 | 1.6 | 100 |

[a] Data from Mineral Resources of the United States, Part II, Nonmetals: U. S. Bureau of Mines, annual reports.

[b] Classes 1A and 1B are combined for the years 1919–1923 inclusive.

## PETROLEUM

Production of petroleum in Illinois in 1931 was 5,023,000 barrels, a decrease of 713,000 barrels from the previous year. The fields in Illinois were under proration restrictions from September 1, 1930, to June 3, 1931, being curtailed to 75 per cent of their normal flow. The removal of proration restrictions after that date increased production by nearly 80 thousand barrels a month and from September to December, 1931, production exceeded the corresponding months of 1930. Production by months since 1925 is shown in Table 18.

TABLE 18.—*Petroleum produced in Illinois, 1925–1931* [a]
(Thousands of barrels of 42 U. S. gallons)

| Month | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 [a] |
|---|---|---|---|---|---|---|---|
| Jan. | 662 | 635 | 589 | 510 | 508 | 487 | 409 |
| Feb. | 604 | 600 | 558 | 516 | 455 | 478 | 376 |
| Mar. | 728 | 729 | 698 | 635 | 603 | 532 | 372 |
| Apr. | 661 | 650 | 601 | 573 | 552 | 540 | 382 |
| May | 586 | 579 | 536 | 468 | 457 | 511 | 378 |
| June | 665 | 662 | 602 | 550 | 517 | 513 | 457 |
| July | 690 | 680 | 576 | 551 | 561 | 531 | 461 |
| Aug. | 647 | 670 | 607 | 573 | 572 | 523 | 437 |
| Sept. | 667 | 657 | 577 | 506 | 532 | 409 | 436 |
| Oct. | 677 | 651 | 557 | 558 | 566 | 428 | 441 |
| Nov. | 639 | 616 | 562 | 508 | 506 | 378 | 429 |
| Dec. | 637 | 631 | 531 | 514 | 490 | 408 | 445 |
| Total | 7,863 | 7,760 | 6,994 | 6,462 | 6,319 | 5,736 | [b]5,023 |

[a] Petroleum in 1929: Mineral Resources of the United States, U. S. Bureau of Mines, Vol. 2, p. 445, 1929; Annual Petroleum Statements No. 83, Sept. 25, 1931, and No. 89, March 2, 1932.
[b] Preliminary figure.

Prices of petroleum fell to unusually low levels in the summer of 1931 as a result of the abnormally large production of oil in the East Texas field and the consequent demoralization of prices. The price changes throughout the year were as follows:

| | *(Per barrel)* |
|---|---|
| January 1 to March 6 | $1.30 |
| March 6 to June 2 | 0.80 |
| June 2 to July 11 | 0.55 |
| July 11 to July 24 | 0.40 |
| July 24 to August 18 | 0.55 |
| August 18 to August 24 | 0.70 |
| August 24 to November 3 | 0.80 |
| November 3 to December 31 | 0.95 |

Economic conditions in the Illinois oil fields are directly affected by the position of the oil industry in the United States. According to the preliminary figures compiled by the United States Bureau of Mines, the production of crude petroleum in the United States in 1931 amounted to 850,275,000 barrels, a decline of approximately 48,000,000 barrels, or 5 per cent below the output of 1930. Domestic demand for oil in 1931 amounted to 900,982,000 barrels, a decline of 25,478,000 barrels from the previous year. This decline occurred mainly in the consumption of fuel oil.

Stocks of oil above ground were decreased in 1931 by 44,245,000 barrels, the largest annual decrease ever made. The depressing effect upon prices of an oversupply of crude and refined stocks has long been recognized and their substantial reduction in 1931 is one of the most hopeful signs in strengthening the market.

The outstanding event in 1931 was the development of the East Texas field. Although discovered early in October, 1930, this field did not become a substantial producer before 1931. The ease of drilling and the high percentage of producing wells, the majority of which were of the gusher type, brought a rapid rise in oil production. Peak production in August—about 1,000,000 barrels daily—was accompanied by a drop in the price of oil to 5 cents a barrel in some places. This break-down of oil prices was reflected in price drops in all other fields.

The East Texas field was shut down under executive order on August 17th and reopened on September 5th with daily production restricted to 225 barrels per well. As more wells were drilled the flow per well was further limited. Production in this field during 1931 was 107,990,000 barrels.

*Drilling in Illinois.*—Only 53 completions of wells were reported in Illinois for 1931 as compared with 253 in 1930. The proportion of producing wells to the total number of wells drilled decreased from 53 per cent to 36 per cent. The average initial production decreased from 26.0 barrels to 6.8 barrels. In the southeastern Illinois field, which has produced approximately 97 per cent of the State's total production of oil to date, the number of completions was the smallest in many years, namely, 17. Of these, 13 were in Crawford County, 3 in Wabash, and 1 in Cumberland, with none in Lawrence and Clark counties. A few wells in Lawrence County were deepened.

The Illinois-Indiana Petroleum Association, consisting of producers and refiners of southeastern Illinois and southwestern Indiana, was organized in 1931. Among the aims of this association are the securing of a better market for the oil products of Illinois and southwestern Indiana, and the promotion of a study and application of improved methods of recovery in the old fields where large amounts of oil not available by pumping are known to remain in the sand.

TABLE 19.—*Output and value of non-fuel*

| | 1927 | | 1928 | |
|---|---|---|---|---|
| | Tons | Value | Tons | Value |
| Cement (Portland) | [a]7,061,240 | $11,312,783 | [a]7,405,667 | $11,602,848 |
| Clay | 198,306 | 381,228 | 248,618 | 446,290 |
| Fluorspar | 46,006 | 863,909 | 65,884 | 1,154,983 |
| Lime | | | | |
| Building | 63,550 | 691,525 | 65,701 | 613,595 |
| Paper mills | 11,996 | 96,816 | 10,884 | 84,683 |
| Tanneries | 7,423 | 64,050 | 6,645 | 60,284 |
| Metallurgy | 3,617 | 28,552 | 4,734 | 34,337 |
| Other uses | 29,217 | 233,150 | 27,559 | 224,102 |
| Total | 115,803 | 1,084,093 | 115,523 | 1,017,001 |
| Limestone | | | | |
| Road metal and concrete | 6,436,870 | 5,231,749 | 6,710,807 | 5,672,703 |
| Rubble | 14,270 | 24,309 | 8,110 | 12,430 |
| Rip-rap | 620,184 | 639,534 | 203,460 | 169,384 |
| Railroad ballast | 1,159,160 | 746,757 | 1,367,430 | 812,586 |
| Flux | 683,840 | 706,675 | 675,270 | 642,406 |
| Agriculture | 647,155 | 579,639 | 565,000 | 511,005 |
| Other uses | 88,790 | 166,423 | 115,293 | 229,915 |
| Total | 9,650,265 | 8,095,086 | 9,645,370 | 8,050,429 |
| Quartz (silica) | 83,028 | 462,804 | 78,883 | 501,373 |
| Sand and gravel | | | | |
| Glass sand | 629,268 | 356,333 | 658,036 | 442,923 |
| Molding sand | 652,955 | 455,913 | 698,722 | 531,468 |
| Structural sand | 4,194,993 | 1,954,694 | 4,630,189 | 2,110,951 |
| Paving and roadmaking sand | 2,798,414 | 1,124,956 | 3,183,271 | 1,163,281 |
| Cutting, grinding and blast sand | 362,804 | 692,984 | 399,198 | 705,895 |
| Fire or furnace sand | [c] | [c] | 31,635 | 23,406 |
| Railroad ballast sand | 160,047 | 33,714 | 170,298 | 33,146 |
| Engine sand | 129,814 | 65,196 | 128,888 | 75,131 |
| Other sands | 2,368,895 | 1,057,313 | 1,658,519 | 1,070,068 |
| Structural gravel | 2,598,191 | 1,237,709 | 3,182,255 | 1,573,130 |
| Paving and roadmaking gravel | 3,324,405 | 1,535,623 | 4,475,823 | 2,069,973 |
| Railroad ballast gravel | 2,100,684 | 648,985 | 1,744,962 | 475,057 |
| Other gravel | 8,233 | 3,514 | 7,535 | 2,126 |
| Total sand and gravel | 19,328,703 | 9,166,934 | 20,969,331 | 10,243,555 |
| Sandstone | 49,260 | 32,420 | 83,550 | 47,961 |
| Tripoli | [d] | [d] | [d] | [d] |

[a] Quantities of Portland cement expressed in barrels.
[b] Included in other uses.
[c] Concealed in other sands.
[d] Concealed.

*mineral products in Illinois, 1927–1931*

| 1929 | | 1930 | | 1931 | |
|---|---|---|---|---|---|
| Tons | Value | Tons | Value | Tons | Value |
| [a]7,738,208 | $11,134,538 | [a]7,951,680 | $10,519,162 | [a]6,380,000 | $5,310,000 |
| 264,332 | 553,797 | 184,555 | 371,645 | 107,712 | 211,873 |
| 67,009 | 1,284,834 | 44,134 | 836,473 | 28,072 | 468,386 |
| 51,476 | 451,709 | 31,535 | 283,273 | 18,683 | 156,485 |
| 9,210 | 65,607 | 5,926 | 41,331 | 2,737 | 18,497 |
| 6,887 | 56,638 | 6,977 | 56,210 | 6,700 | 56,055 |
| 5,782 | 39,864 | 4,126 | 30,499 | 5,157 | 33,648 |
| 56,027 | 359,494 | 41,145 | 309,830 | 38,041 | 218,109 |
| 119,382 | 973,312 | 89,709 | 721,143 | 71,317 | 547,680 |
| 5,327,310 | 4,221,762 | 4,637,390 | 3,355,031 | 3,600,769 | 2,391,763 |
| [b] | [b] | 3,440 | 5,199 | 4,412 | 5,450 |
| 135,080 | 132,971 | 820,090 | 763,624 | 291,112 | 292,761 |
| 936,240 | 724,302 | 475,720 | 346,032 | 361,637 | 241,619 |
| 786,018 | 749,721 | 604,890 | 537,829 | 460,087 | 393,645 |
| 947,800 | 843,693 | 868,430 | 740,785 | 247,269 | 227,020 |
| 212,632 | 292,815 | 128,850 | 160,589 | 243,809 | 369,199 |
| 3,345,080 | 6,965,264 | 7,538,810 | 5,909,089 | 5,209,095 | 3,921,457 |
| 91,120 | 555,610 | 71,976 | 438,757 | 56,262 | 335,219 |
| 552,539 | 502,434 | 489,824 | 490,533 | 416,366 | 416,066 |
| 1,135,820 | 804,371 | 589,238 | 455,416 | 327,097 | 246,858 |
| 4,011,481 | 1,573,236 | 2,685,313 | 1,258,618 | 1,889,757 | 735,029 |
| 2,020,278 | 822,156 | 2,905,191 | 1,073,470 | 1,668,587 | 718,984 |
| 449,475 | 901,145 | 322,976 | 657,689 | 170,752 | 427,102 |
| 65,795 | 54,768 | 41,416 | 29,392 | 2,684 | 5,127 |
| 747,834 | 184,928 | 535,670 | 118,659 | 246,727 | 55,333 |
| 142,864 | 75,307 | 112,184 | 63,723 | 76,082 | 39,777 |
| 301,658 | 353,420 | 1,749,351 | 840,505 | 245,876 | 122,687 |
| 3,401,945 | 1,589,935 | 1,947,176 | 981,412 | 1,290,073 | 597,697 |
| 3,363,578 | 1,564,304 | 4,873,777 | 2,067,529 | 3,539,315 | 1,599,762 |
| 1,855,200 | 611,486 | 1,140,297 | 342,306 | 573,097 | 169,338 |
| 207,736 | 33,748 | 6,280 | 2,773 | 15,978 | 10,066 |
| 18,256,203 | 9,071,238 | 17,398,693 | 8,382,025 | 10,462,391 | 5,143,826 |
| 62,650 | 37,944 | 52,110 | 30,208 | 45,102 | 25,843 |
| 12,889 | 139,557 | 9,954 | 116,307 | 9,057 | 111,378 |

# NON-FUEL MINERALS

## Statistical Summary

Illinois ranks seventh among the states in output and value of non-metallic minerals. These include clay and clay products, sand and gravel, limestone and dolomite, cement, fluorspar, lime, puverized silica sand, tripoli, sandstone, and fullers' earth. The production of these minerals and their value is given by principal uses in Table 19 for the years 1927 to 1931 (pp. 32-33).

## Clay and Clay Products

Clay products having a value of $10,585,136 were produced in 1931 as compared with a value of $19,972,156 in 1930, a decline of 47 per cent. This sharp decrease in production was partly the result of a continued decline in building activity and partly the result of an unusually large accumulation of stocks. Table 20 gives a preliminary summary of the value of clay products by counties for 1931.

TABLE 20.—*Clay products (including pottery) and nonclay refractories in Illinois in 1931* [a]

(Number of establishments and value of products by counties)

| County | Number of establishments | Value of products |
|---|---|---|
| Individual counties: | | |
| Cook | 21 | $2,153,210 |
| Kankakee | 4 | 238,721 |
| LaSalle | 8 | 862,914 |
| Macoupin | 3 | 10,958 |
| Madison | 5 | 389,305 |
| Tazewell | 4 | 241,374 |
| Vermilion | 3 | 736,891 |
| Groups of counties: | | |
| Adams | 1 | |
| Cass | 1 | |
| Greene | 3 | |
| Jackson | 1 | |
| Logan | 1 | |
| Menard | 1 | 891,082 |
| St. Clair | 3 | |
| Sangamon | 2 | |
| Schuyler | 1 | |
| Scott | 1 | |
| Boone | 1 | |
| Grundy | 1 | |
| Kane | 1 | 1,138,514 |
| McHenry | 1 | |
| Will | 2 | |
| Bureau | 3 | |
| Knox | 2 | |
| Livingston | 3 | 1,102,076 |
| Marshall | 1 | |
| Woodford | 1 | |
| Crawford | 1 | |
| Edwards | 2 | |
| Fayette | 1 | |
| Hamilton | 1 | |
| Iroquois | 2 | 1,788,300 |
| Macon | 2 | |
| McLean | 1 | |
| Saline | 1 | |
| Henry | 1 | |
| McDonough | 6 | |
| Mercer | 2 | |
| Rock Island | 1 | 1,031,791 |
| Warren | 1 | |
| Whiteside | 1 | |
| Total | 102 | $10,585,136 |

[a] Data supplied by the U. S. Bureau of the Census.

According to the U. S. Bureau of the Census, the above figures are preliminary and subject to revision. They are based in large part on returns received prior to April 15, 1932, but include estimates for 14 establishments whose returns had not been received. The establishments reporting for 1930, exclusive of the 14 whose returns were outstanding on April 15, 1932, contributed 89.4 per cent of the total for Illinois; and the combined value of products reported by such of these establishments as were active in 1931 (88 in number) represents a decrease of 47.7 per cent as compared with the 1930 total, exclusive of that part reported by the 14 establishments whose returns were outstanding on April 15, 1932. In estimating the figures for the State and for the individual counties and groups of counties, it has therefore been assumed that the value of the products of each of the 14 establishments whose returns had not been received prior to April 15 was 47.7 per cent smaller for 1931 than for 1930.

The extent to which the clay products industry has been affected by the depression is illustrated in Table 21 which gives the value of clay products from 1920 to 1931.

TABLE 21.—*Value of clay products in Illinois, 1920–1931* [a]

| Year | Value | Index No. [b] |
|---|---|---|
| 1920 | $26,138,419 | 100 |
| 1921 | 19,041,182 | 73 |
| 1922 | 26,784,263 | 102 |
| 1923 | 34,218,987 | 131 |
| 1924 | 33,591,368 | 128 |
| 1925 | 36,763,980 | 140 |
| 1926 | 37,030,004 | 142 |
| 1927 | 34,346,886 | 131 |
| 1928 | 32,026,885 | 122 |
| 1929 | 27,391,068 | 104 |
| 1930 | 19,972,156 | 76 |
| 1931 [c] | 10,585,136 | 40 |
| Total | $337,890,334 | |
| Average | $26,157,526 | 100 |

[a] Compiled from Mineral Resources of the United States, Annual Summaries. Data for 1930 and 1931 supplied by the Bureau of the Census.
[b] Average of 1920–1931 = 100.
[c] Preliminary figure.

The trend of values as shown by index of average production for this period indicates the comparative position of the industry in the business depressions of 1921 and 1930-31. This corresponds somewhat to the trend in the value of building permits issued for the same period, although the index of building activity shows wider fluctuations than the value of clay products manufactures (Table 22).

TABLE 22.—*Value of building permits awarded in Chicago and in a total of 354 cities, 1920–1931* [a]

(In thousands of dollars)

| Year | Chicago | Index No. [b] | Total of 354 cities | Index No. [b] |
|---|---|---|---|---|
| 1920 | $ 76,173 | 33 | $ 1,675,227 | 57 |
| 1921 | 125,005 | 54 | 1,916,437 | 65 |
| 1922 | 227,742 | 98 | 2,888,082 | 98 |
| 1923 | 329,604 | 142 | 3,536,737 | 119 |
| 1924 | 296,894 | 128 | 3,702,135 | 125 |
| 1925 | 360,804 | 156 | 4,393,364 | 149 |
| 1926 | 364,584 | 157 | 4,121,965 | 139 |
| 1927 | 352,936 | 152 | 3,651,036 | 123 |
| 1928 | 315,800 | 136 | 3,500,730 | 118 |
| 1929 | 202,287 | 87 | 3,096,839 | 104 |
| 1930 | 79,613 | 34 | 1,776,623 | 60 |
| 1931 | 46,444 | 20 | 1,212,196 | 41 |
| Total | $2,778,886 | | $35,471,371 | |
| Average | $231,574 | 100 | $2,955,946 | 100 |

[a] Engineering News Record, p. 61, Feb. 4, 1932.
[b] Average of 1920–1931 = 100.

A detailed analysis of building permits for 1930 and 1931 by principal cities in Illinois and in a few cities of bordering states indicates the extent to which building operations in this area have been curtailed in 1931. For the seventeen cities listed in Table 23, the total decrease of building activity in 1931 as compared with that of 1930 was 34.4 per cent. This average figure, however, conceals wide variations from locality to locality. Some cities actually registered a gain over 1930, notably Hammond and Indianapolis, Indiana; and Evanston and Springfield, Illinois; while St. Louis, Missouri, showed only a slight decline.

A comparison of building permits awarded in December, 1931, with those awarded in December, 1930, shows trends that conflict somewhat with the yearly statistical position of these cities (Table 23). For instance, Chicago shows a gain in December, 1931, over December of the previous year although the total building activity for 1931 is 41.6 per cent less than that of 1930. Springfield shows a substantial gain in percentage although the volume is rather small, whereas Peoria increased its activities five-fold over the previous December. On the other hand, building activities in Milwaukee, Wisconsin; Hammond, Indiana; Davenport, Iowa; Rockford, Illinois; and St. Louis, Missouri, declined sharply.

A more detailed statement of production and value by important classes of products is given in Table 24.

TABLE 23.—*Value of building permits awarded in principal cities in Illinois and neighboring states, 1930 and 1931* [a]

| City | 1930 | 1931 | Per cent decline in 1931 | December, 1930 | December, 1931 | Per cent decline in December, 1931 |
|---|---|---|---|---|---|---|
| Berwyn | $ 912,970 | $ 694,898 | 24.0 | $ 92,500 | $ 13,400 | 85.5 |
| Chicago | 79,604,950 | 46,444,030 | 41.6 | 2,285,900 | 2,518,450 | [b]15.0 |
| Davenport, Iowa | 2,532,543 | 1,198,060 | 52.8 | 194,715 | 22,572 | 88.4 |
| East St. Louis | 1,471,799 | 1,077,178 | 26.8 | 71,115 | 7,431 | 89.6 |
| Evanston | 3,151,950 | 3,251,250 | [b]3.0 | 77,000 | 59,000 | 23.4 |
| Gary, Ind | 1,422,945 | 990,585 | 30.4 | 36,935 | 12,550 | 66.1 |
| Hammond, Ind | 2,037,677 | 3,314,849 | [b]62.8 | 74,030 | 14,447 | 80.5 |
| Indianapolis, Ind | 8,203,649 | 9,480,599 | [b]15.1 | 365,072 | 163,703 | 55.2 |
| Milwaukee, Wis | 33,764,378 | 16,625,991 | 50.8 | 2,123,682 | 446,280 | 79.0 |
| Oak Park | 1,861,155 | 1,237,925 | 33.6 | 499,130 | 426,060 | 14.8 |
| Peoria | 3,535,790 | 2,403,427 | 32.0 | 176,700 | 882,290 | [b]500.0 |
| Quincy | 1,031,674 | 1,501,888 | [b]46.0 | 18,500 | 7,100 | 61.6 |
| Racine, Wis | 3,933,623 | 1,756,496 | 55.4 | 52,960 | 13,575 | 74.4 |
| Rockford | 2,490,755 | 614,797 | 76.3 | 169,940 | 14,310 | 91.6 |
| Springfield | 776,650 | 1,828,166 | [b]135.0 | 19,315 | 51,210 | [b]268.0 |
| St. Louis, Mo | 17,347,865 | 16,637,809 | 3.5 | 2,273,466 | 287,135 | 87.4 |
| Waukegan | 1,783,370 | 727,694 | 69.2 | 41,995 | 38,170 | 8.7 |
| Total (or average) | $165,863,753 | $109,785,042 | 34.4 | $8,572,955 | $4,977,683 | 42.0 |

[a] Bradstreets, January 23, 1932, p. 97.
[b] Increase over 1930.

TABLE 24.—*Production and stocks of specified clay products in Illinois, 1930 and 1931* [a]

| Class and year | Number of establishments | Production | | Stocks on hand, December 31 |
|---|---|---|---|---|
| | | Quantity (thousands) | Value | |
| Common brick: | | | | |
| 1931 | 50 | 151,280 | $1,321,585 | 65,372 |
| 1930 | 59 | 394,283 | 3,708,649 | 200,262 |
| Face brick: | | | | |
| 1931 | 23 | 80,390 | 1,142,348 | 56,101 |
| 1930 | 29 | 148,428 | 2,301,076 | 61,469 |
| Hollow brick[b]: | | | | |
| 1930 | 5 | 1,655 | 16,014 | 750 |
| Hollow building tile: Partition, load-bearing, furring, book tile— | | | | |
| 1931 | 29 | 106,291 | 398,643 | 67,805 |
| 1930 | 32 | 211,636 | 997,628 | 85,710 |
| Floor-arch, silo and corn-crib tile; radial chimney blocks; fireproofing tile[b] | | | | |
| 1930 | 6 | 6,656 | 43,285 | 10,460 |

[a] Data from Division of Manufactures, Bureau of the Census.
[b] Figures for 1931 withheld; less than three establishments.

## BRICK PRODUCTION AND SHIPMENTS

Quiet market conditions in the brick industry are reflected in the large accumulation of stocks and the declining shipments from plants. The situation in the latter part of 1931 and the early part of 1932 is presented in Table 25 for common brick, face brick, and hollow building tile (p. 40).

Collection of monthly data on structural clay products was organized by the Bureau of the Census beginning October, 1931, and the following table presents data for the state of Illinois for certain plants from October, 1931, to the following February. The outstanding fact revealed is the large quantities of stocks on hand in proportion to the monthly shipments. For the 27 plants reporting common bricks in October, 1931, the stocks on hand corresponded to nearly 12 months' shipments at the current monthly rate whereas in the following February the stocks corresponded to 24 months' supply at the current rate of shipment. Similar ratios appear for face brick and hollow building tile. The absence of a complete year's record of shipments and stocks by months, together with the fact that the number of companies that reported to the Bureau was not constant during the period precludes the possibility of an analysis of the ratio of average monthly

TABLE 25.—*Shipments of structural clay products, stocks on hand, and average value by months from October, 1931, to February, 1932* [a]

| Month | Number of plants reporting | Shipments in thousands | Value of shipments | Stocks on hand at end of month, in thousands | Average per plant of all plants reporting | | |
|---|---|---|---|---|---|---|---|
| | | | | | Shipments in thousands | Value of shipments | Stocks on hand; value per thousand |
| **COMMON BRICK** | | | | | | | |
| October | 27 | 9,531 | $97,858 | 109,244 | 353 | $3,624 | $10.27 |
| November | 32 | 6,279 | 62,942 | 112,376 | 196 | 1,967 | 10.02 |
| December | 34 | 5,074 | 46,718 | 107,656 | 149 | 1,374 | 9.21 |
| January | 39 | 4,307 | 35,469 | 108,780 | 110 | 909 | 8.24 |
| February | 39 | 4,214 | 33,298 | 104,810 | 108 | 854 | 7.90 |
| **FACE BRICK** | | | | | | | |
| October | 12 | 4,573 | 68,519 | 38,178 | 361 | 5,710 | $14.98 |
| November | 16 | 3,166 | 47,985 | 41,239 | 198 | 2,999 | 15.16 |
| December | 19 | 3,105 | 46,817 | 44,282 | 163 | 2,464 | 15.08 |
| January | 22 | 2,182 | 30,945 | 51,867 | 99 | 1,407 | 14.18 |
| February | 22 | 2,053 | 30,617 | 52,634 | 93 | 1,382 | 14.91 |
| **HOLLOW BUILDING TILE** | | | | | | | |
| | | Shipments in tons | Value of Shipments | Stocks on hand | Shipments in tons | Value of Shipments | Value per ton |
| October | 15 | 5,374 | $27,523 | 74,399 | 358 | $1,835 | $5.12 |
| November | 16 | 4,124 | 20,877 | 74,181 | 258 | 1,305 | 5.06 |
| December | 16 | 4,117 | 20,575 | 73,055 | 257 | 1,287 | 5.00 |
| January | 19 | 3,484 | 14,755 | 74,478 | 183 | 776 | 4.23 |
| February | 19 | 3,069 | 11,306 | 69,296 | 161 | 595 | 3.68 |

[a] Structural Clay Products, Monthly release of the U. S. Bureau of the Census.

shipments to average stocks on hand, which would more truly indicate the number of months of stocks ahead. Nevertheless the quantity of stocks on hand at plants appears to be excessive.

The effect of surplus stocks also makes itself felt on prices. Average prices per thousand for common brick declined sharply from $10.27 in October, 1931, to $7.90 in the following February. The price level for face brick held firmly at about $15.00, but hollow building tile suffered a decline from $5.12 to $3.68 per ton.

The wide fluctuation in construction activities between the high levels of 1925 and 1926 and the low levels of 1920 and 1931 has made it impossible for the clay products manufacturers to maintain reasonably uniform programs of operation. The economic importance of the construction industry in the employment of large numbers of workers is indicated in Table 22 which shows an expenditure, in a total of 354 cities, of more than 4 billion dollars in years of greatest activity and an average of nearly 3 billion dollars for the 12-year period. A range of expenditure from 4.3 billion dollars to 1.2 billion cannot occur without widespread unemployment and numerous idle factories in the lean years. The range between maximum and minimum volume of activity exceeds that of other industries such as food stuffs preparation, power production, coal mining, oil production, or even the manufacture of automobiles. Such extreme fluctuations encourage plant extensions in active periods and, correspondingly, impose a heavy carrying charge on the industry when the plants are idle or working only part time.

## Portland Cement

Portland cement production was 6,380,000 barrels in 1931 valued at $5,310,000. This was a decline of 20 per cent in quantity from the previous year for which the figures are 7,951,680 barrels valued at $10,519,162.

TABLE 26.—*Portland Cement Consumption in Illinois, 1930–1931* [a]
(In barrels)

| Month | 1930 | 1931 |
|---|---|---|
| January | 182,347 | 195,146 |
| February | 356,200 | 227,023 |
| March | 201,551 | 130,801 |
| April | 694,367 | 717,468 |
| May | 1,038,904 | 882,739 |
| June | 1,212,319 | 1,069,134 |
| July | 1,495,891 | 1,054,935 |
| August | 1,604,378 | 1,063,517 |
| September | 1,704,696 | 975,734 |
| October | 1,586,016 | 856,580 |
| November | 655,302 | 406,836 |
| December | 247,845 | 193,244 |
| Total | 10,979,816 | 7,773,157 |

[a] Based on shipments from mills into State. Compiled from the Monthly Cement Statements of the U. S. Bureau of Mines for the years 1930 and 1931, and January 1932.

Prices of portland cement in Chicago were uniformly lower in 1931 as compared with 1930 and fell off sharply in December. Prices as reported monthly by the Engineering News-Record were as follows:

TABLE 27.—*Portland cement prices in Chicago, 1930 and 1931* [a]
(Per barrel)

| Month | 1930 | 1931 |
|---|---|---|
| January | $2.20 | $2.20 |
| February | 2.20 | 2.20 |
| March | 2.10 | 2.10 |
| April | 2.20 | 2.10 |
| May | 2.20 | 1.95 |
| June | 2.20 | 1.95 |
| July | 2.20 | 1.95 |
| August | 2.20 | 1.95 |
| September | 2.20 | 1.95 |
| October | 2.20 | 1.95 |
| November | 2.20 | 1.95 |
| December | 2.20 | 1.65 |

[a] Engineering News Record.

Portland cement consumption is to a certain extent an indicator of the market outlet for those materials which are used in road building and construction because the concrete which furnishes the market for cement also furnishes the principal markets for sand, gravel, crushed stone, and slag.

The consumption of cement in Illinois in 1931, as reported by the United States Bureau of Mines, was 30 per cent below the 1930 level, as shown in Table 28.

## Sand and Gravel

The sharp decline in production of sand and gravel in 1931 stands out in sharp contrast with the production of previous years. The record since 1927 as revealed in Table 28 (pp. 46-47) is as follows:

| | |
|---|---|
| 1927 | 19,328,703 tons |
| 1928 | 20,969,331 tons |
| 1929 | 18,256,203 tons |
| 1930 | 17,398,693 tons |
| 1931 | 10,462,391 tons |

Just as in the case of clay products the greater part of this decline is attributed to the slump in building operations and road construction. An examination, by uses, shows that the production of structural sand declined from 2.7 million to 1.9 million tons; paving and road making sand, from 2.9 million to 1.7 million tons; gravel for structural purposes, from 1.9 million to 1.3 million tons; paving and road making gravel, from 4.9 million to 3.5 million tons. Substantial declines may also be noted in sand and gravel purchased by railroads. The trend toward economy in public expenditures and by railroads is a contributory factor to the low level of purchases.

## Limestone

The percentage of decrease in limestone production was not as pronounced as that of sand and gravel. Production in 1931 was 5,209,095 tons as compared with 7,538,810 tons in 1930. In this case also, limestone for construction purposes is the chief factor in the decline as between 65 and 70 per cent of all limestone output is used for road metal and concrete. Agricultural limestone, although a minor product, suffered the greatest percentage of loss from the 1930 level of consumption, due to unfavorable economic conditions on farms. The data on limestone production are given in Table 28, pp. 48-49.

## Fluorspar

The fluorspar industry, in common with the industries to which it is related, suffered from the extreme curtailment in general business activities. Fluorspar shipped to consumers from Illinois mines in 1930 and 1931 was as follows:

| Year | Production | Value | Average |
|---|---|---|---|
| 1930 | 44,134 tons | $836,473 | $18.95 |
| 1931 | 28,072 tons | 468,386 | 16.69 |

Of the 1931 production, 22,397 tons was used in steel manufacture, 723 tons in foundry work, 1,463 tons in aluminum manufacture and the remainder in other industries. Stocks of fluorspar on hand at the mines on December 31, 1931 were as follows:

Crude (run of mine).....8,943 tons
Gravel.....35,552 tons
Lump.....1,128 tons
Ground.....455 tons

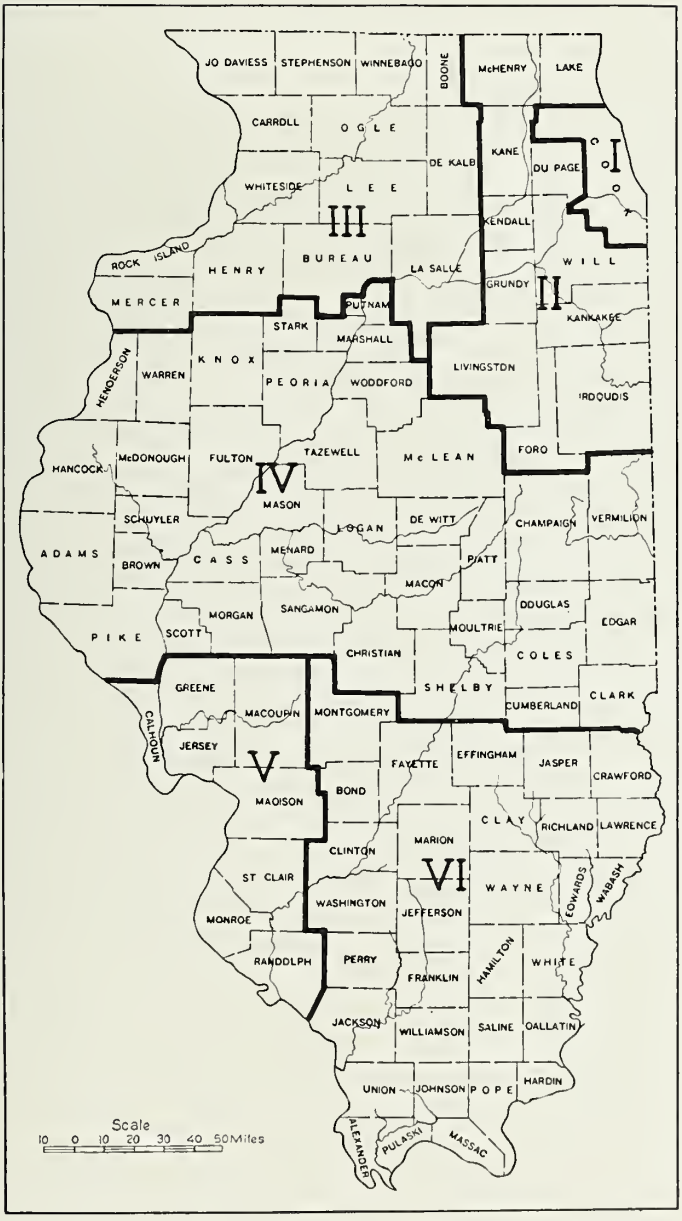


FIG. 1.—Index map of Illinois showing location of districts according to which production of sand and gravel and limestone (Table 22, pp. 46-49) is given.

TABLE 28.—*Production of sand and gravel and limestone in Illinois, 1927–1931* [a]

**SAND AND GRAVEL**

| District (Fig. 1, p. 45) | 1927 | | 1928 | | 1929 | | 1930 | | 1931 (Preliminary figures) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Tons | Value | Tons | Value | Tons | Value | Tons | Value | Tons | Value |
| **STRUCTURAL SAND** | | | | | | | | | | |
| District | | | | | | | | | | |
| I | 1,106,094 | 733,018 | 1,391,814 | 844,512 | 765,310 | 389,356 | 1,131,123 | 614,771 | [a]209,922 | [a]118,066 |
| II | 1,515,797 | 478,197 | 1,672,751 | 498,512 | 1,689,022 | 438,252 | 531,944 | 142,711 | 848,643 | 245,450 |
| III | 890,317 | 163,224 | 605,749 | 254,648 | 742,510 | 270,102 | 478,438 | 166,827 | 295,771 | 96,928 |
| IV | 430,721 | 246,093 | 624,742 | 350,118 | 535,686 | 312,834 | 346,842 | 216,719 | 579,233 | 211,189 |
| V | [a]186,723 | [a]114,065 | [a]260,040 | [a]161,580 | [a]265,884 | [a]148,530 | [a]228,750 | [a]135,035 | 187,101 | 95,423 |
| VI | 71,236 | 35,945 | 135,969 | 77,585 | 107,876 | 59,136 | 41,730 | 23,174 | 24,367 | 15,965 |
| [a] Includes structural gravel. | | | | | | | | | | |
| **PAVING AND ROADMAKING SAND** | | | | | | | | | | |
| I | [a]202,199 | [a]106,744 | 17,492 | 10,914 | [a]61,183 | [a]21,269 | [a]101,148 | [a]35,762 | ..... | ..... |
| II | 1,265,876 | 344,583 | 1,297,306 | 332,091 | 738,587 | 203,573 | 1,470,719 | 361,972 | 737,163 | 261,837 |
| III | 412,518 | 155,067 | 566,883 | 220,153 | 389,404 | 144,102 | 415,301 | 171,091 | 168,659 | 54,676 |
| IV | 537,067 | 294,090 | 774,151 | 298,905 | 266,382 | 138,268 | 441,871 | 312,774 | 296,490 | 140,126 |
| V | [a]185,531 | [a]108,446 | [a]231,230 | [a]133,854 | [a]276,450 | [a]149,596 | [a]251,135 | [a]174,233 | [a]203,519 | [a]114,758 |
| VI | 101,938 | 133,854 | 110,760 | 80,857 | 89,832 | 36,952 | 182,087 | 87,896 | 171,628 | 87,599 |
| [a] Includes paving and roadmaking gravel. | | | | | | | | | | |
| **STRUCTURAL GRAVEL** | | | | | | | | | | |
| I | 80,220 | 35,496 | 120,429 | 65,160 | 227,588 | 120,475 | 201,685 | 80,058 | (a) | (a) |
| II | 1,335,002 | 573,704 | 1,600,476 | 643,501 | 1,852,826 | 745,142 | 796,528 | 345,482 | 685,925 | 233,585 |
| III | 748,523 | 354,280 | 575,838 | 300,763 | 708,128 | 331,830 | 510,721 | 265,121 | 234,915 | 124,166 |
| IV | 351,317 | 216,405 | 664,686 | 422,194 | 528,129 | 321,240 | 373,010 | 248,259 | 262,025 | 182,524 |
| V | (a) | (a) | (a) | (a) | (a) | (a) | (a) | (a) | 3,785 | 4,570 |
| VI | 76,649 | 50,599 | 216,777 | 135,490 | 80,953 | 66,244 | 65,232 | 42,792 | 32,084 | 23,729 |
| [a] Included in structural sand. | | | | | | | | | | |

## PAVING AND ROADMAKING GRAVEL

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| I | (a) | (a) | 172,903 | 73,320 | (a) | (a) | (a) | (a) | 45,563 | 24,236 |
| II | 1,578,167 | 620,185 | 1,765,110 | 694,273 | 1,211,659 | 425,435 | 2,579,345 | 947,587 | 2,145,062 | 910,823 |
| III | 980,792 | 501,487 | 1,404,139 | 635,206 | 1,265,454 | 599,734 | 1,149,513 | 461,285 | 614,876 | 275,874 |
| IV | 310,431 | 163,065 | 845,482 | 485,626 | 595,806 | 326,510 | 750,636 | 414,854 | 502,163 | 263,134 |
| V | (a) | (a) | (a) | (a) | (a) | (a) | (a) | (a) | (a) | (a) |
| VI | 256,897 | 144,440 | 282,905 | 177,099 | 247,958 | 195,429 | 297,340 | 207,081 | 176,311 | 94,480 |

[a] Included in paving and roadmaking sand.

## RAILROAD BALLAST SAND AND GRAVEL

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| I | [a]673,288 | [a]131,450 | [b]694,733 | [b]127,444 | [c]488,224 | [c]83,730 | [c]496,694 | [c]78,329 | [c]245,269 | [c]41,776 |
| II | 826,887 | 311,229 | 1,024,109 | 313,453 | 1,265,723 | 443,162 | 849,304 | 292,095 | 289,687 | 128,033 |
| III | 389,238 | 110,952 | 124,721 | 41,582 | 419,981 | 102,145 | 61,908 | 8,931 | 103,656 | 11,839 |
| IV | 346,664 | 116,890 | (b) | (b) | 429,106 | 167,377 | 268,060 | 81,610 | 181,212 | 43,023 |
| V | (a) | (a) | | | | | | | | |
| VI | (a) | (a) | 80,077 | 26,984 | (c) | (c) | (c) | (c) | (c) | (c) |

[a] Districts I, V, and VI combined.
[b] Districts I and IV combined.
[c] Districts I and VI combined.

## OTHER SAND AND GRAVEL

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| I | 1,607,140 | 771,899 | (a) | (a) | | | 1,609,608 | 691,921 | [b]31,625 | [b]9,400 |
| II | 566,533 | 130,967 | 92,714 | 64,834 | 427,050 | 90,335 | 7,203 | 4,062 | 77,343 | 15,045 |
| III | 1,796,200 | 1,602,993 | 1,946,590 | 1,899,044 | 2,225,687 | 2,486,517 | 1,551,846 | 1,617,447 | 1,078,788 | 1,187,096 |
| IV | 63,510 | 41,207 | 96,679 | 70,952 | 38,391 | 18,518 | 16,584 | 9,296 | 25,880 | 19,736 |
| V | 33,800 | 20,250 | 37,504 | 21,501 | 33,743 | 21,015 | (a) | (a) | (b) | (b) |
| VI | 77,343 | 60,577 | 105,326 | 74,598 | 79,093 | 62,605 | 70,623 | 47,176 | 50,468 | 33,177 |

[a] Concealed in total; less than three producers.
[b] Districts I and V combined.

## TOTAL SAND AND GRAVEL

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| I | 3,787,056 | 1,905,800 | 3,767,464 | 1,869,618 | 1,708,405 | 730,766 | 3,622,445 | 1,562,165 | 574,701 | 233,841 |
| II | 7,088,262 | 2,458,865 | 7,444,066 | 2,511,201 | 7,184,867 | 2,345,899 | 6,242,694 | 2,096,509 | 4,815,485 | 1,806,351 |
| III | 5,085,088 | 3,013,807 | 5,227,678 | 3,356,229 | 5,758,991 | 3,945,063 | 4,172,106 | 2,823,259 | 2,457,560 | 1,899,405 |
| IV | 2,180,703 | 1,136,878 | 3,126,400 | 1,672,225 | 2,428,256 | 1,314,192 | 2,227,467 | 1,211,426 | 1,697,895 | 916,935 |
| V | 430,054 | 249,951 | 471,489 | 283,436 | 485,464 | 275,151 | 426,333 | 256,860 | 345,657 | 206,632 |
| VI | 757,540 | 401,623 | 932,234 | 550,846 | 690,220 | 460,167 | 707,648 | 427,935 | 469,862 | 258,303 |
| Illinois | 19,328,703 | 9,166,934 | 20,969,331 | 10,243,555 | 18,256,203 | 9,071,238 | 17,398,693 | 8,382,025 | 10,465,212 | 5,115,674 |

TABLE 28.—(Continued)

**LIMESTONE**

| District (Fig. 1, p. 45) | 1927 | | 1928 | | 1929 | | 1930 | | 1931 (Preliminary figures) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Tons | Value | Tons | Value | Tons | Value | Tons | Value | Tons | Value |
| **ROAD METAL AND CONCRETE** | | | | | | | | | | |
| District | | | | | | | | | | |
| I | 4,442,881 | 3,361,052 | 4,221,330 | 3,430,206 | 3,158,623 | 2,325,786 | 2,800,682 | 1,780,406 | 1,906,908 | 1,130,453 |
| II | 1,208,065 | 1,040,451 | 1,270,479 | 1,032,787 | 1,070,421 | 855,106 | 786,727 | 636,466 | 844,033 | 584,921 |
| III | 94,304 | 101,751 | 81,637 | 98,342 | 60,901 | 73,045 | 94,646 | 102,850 | 81,498 | 62,241 |
| IV | 58,583 | 52,394 | 46,841 | 73,270 | 37,561 | 56,157 | 49,783 | 68,806 | 44,994 | 61,620 |
| V | 486,063 | 536,950 | 907,916 | 884,155 | 889,458 | 822,993 | 790,214 | 672,479 | 601,236 | 419,108 |
| VI | 146,976 | 139,151 | 198,604 | 174,943 | 110,350 | 89,275 | 115,342 | 94,024 | 120,300 | 89,940 |
| **RAILROAD BALLAST** | | | | | | | | | | |
| I | 510,569 | 258,483 | 718,536 | 304,160 | 497,091 | 382,550 | 175,910 | 122,159 | 132,175 | 85,247 |
| II | 411,999 | 329,805 | 553,112 | 425,613 | 295,201 | 231,703 | 162,173 | 113,537 | 135,368 | 86,889 |
| III | | | | | | | | | | |
| IV | [a]14,498 | [a]11,516 | | | | | | | | |
| V | 222,091 | 146,953 | 85,178 | 73,571 | 141,450 | 107,268 | 133,168 | 99,024 | 101,847 | 61,587 |
| VI | (a) | (a) | (b) | (b) | (b) | (b) | (b) | (b) | (b) | (b) |
| **AGRICULTURAL LIMESTONE** | | | | | | | | | | |
| I | 305,463 | 186,381 | 187,669 | 127,232 | 425,154 | 294,515 | 325,485 | 148,517 | | |
| II | 119,258 | 100,617 | 144,076 | 113,526 | 170,075 | 153,378 | 232,722 | 184,927 | 73,207 | 58,350 |
| III | 3,999 | 5,890 | 5,390 | 7,480 | 3,133 | 6,196 | 5,400 | 9,200 | 3,900 | 6,325 |
| IV | 24,888 | 40,576 | 25,724 | 40,894 | 32,004 | 51,667 | 39,080 | 66,551 | 14,866 | 23,893 |
| V | 156,576 | 199,153 | 157,040 | 178,923 | 287,275 | 307,206 | 216,204 | 285,334 | 99,969 | 102,514 |
| VI | 36,971 | 47,022 | 45,102 | 42,950 | 30,157 | 30,731 | 49,535 | 46,256 | 16,637 | 15,499 |

[a] Districts IV and VI combined.
[b] Concealed in total; less than three producers.

## FLUX

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| I | [a]932,495 | [a]393,326 | [b]463,090 | [b]390,589 | 509,178 | 423,591 | 411,564 | 317,163 | 320,601 | 236,134 |
| II | | | | | | | | | | |
| III | (a) | (a) | (b) | (b) | | | | | | |
| IV | (a) | (a) | 750 | 1,210 | 944 | 1,399 | 407 | 741 | (c) | (c) |
| V | 251,346 | 313,349 | 211,432 | 250,607 | 275,896 | 324,731 | 192,924 | 219,930 | 139,287 | 157,168 |
| VI | | | | | | | | | | |

[a] Districts I, III and IV combined.
[b] Districts I and III combined.
[c] Concealed in total; less than three producers.

## RUBBLE AND RIP-RAP

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| I | [a]560,400 | [a]565,300 | 57,869 | 47,277 | [b]33,325 | [b]24,703 | 436,868 | 427,073 | 532,266 | 445,951 |
| II | 10,744 | 16,974 | 84,341 | 50,526 | 8,862 | 13,755 | 30,217 | 21,140 | [c]8,471 | [c]10,220 |
| III | (a) | (a) | (d) | (d) | (b) | (b) | | | | |
| IV | 27,084 | 36,066 | 17,690 | 23,265 | 23,318 | 27,462 | 58,593 | 60,253 | 1,298 | 1,628 |
| V | 23,510 | 32,586 | 29,402 | 39,006 | 73,139 | 73,815 | 203,702 | 182,054 | 74,090 | 66,546 |
| VI | 12,703 | 12,917 | 18,588 | 17,730 | (b) | (b) | (d) | (d) | (c) | (c) |

[a] Districts I and III combined.
[b] Districts I, III and VI combined.
[c] Districts II and VI combined.
[d] Concealed in total; less than three producers.

## MISCELLANEOUS LIMESTONE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| I | 50,458 | 91,995 | 57,424 | 104,855 | 113,306 | 148,612 | [a]74,998 | [a]56,127 | 15,805 | 44,802 |
| II | 17,741 | 14,871 | 13,812 | 14,557 | 70,370 | 56,779 | (a) | (a) | (b) | (b) |
| III | | | [c]8,659 | [c]29,489 | | | (a) | (a) | 6,690 | 4,802 |
| IV | 12,778 | 40,554 | 19,393 | 60,014 | 16,454 | 57,688 | 17,889 | 49,424 | 9,494 | 30,093 |
| V | 6,332 | 17,503 | (c) | (c) | 6,771 | 22,076 | 35,983 | 54,889 | 86,459 | 115,933 |
| VI | | | (c) | (c) | | | | | | |

[a] Districts I, II, III combined.
[b] Concealed in total; less than three producers.
[c] Districts III, V, VI combined.

## TOTAL LIMESTONE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| I | 6,293,415 | 4,842,793 | 5,702,168 | 4,398,694 | 4,733,352 | 3,595,454 | 4,208,749 | 2,831,215 | 2,717,777 | 1,874,176 |
| II | 1,769,250 | 1,504,218 | 2,065,920 | 1,637,009 | 1,614,937 | 1,310,721 | 1,224,407 | 974,796 | 1,064,946 | 796,457 |
| III | 124,323 | 141,971 | 76,887 | 94,170 | 72,152 | 82,071 | 102,046 | 119,066 | 92,088 | 73,393 |
| IV | 127,003 | 172,157 | 110,358 | 198,650 | 111,418 | 195,269 | 165,669 | 245,924 | 72,086 | 117,602 |
| V | 1,145,924 | 1,264,494 | 1,394,692 | 1,450,316 | 1,674,989 | 1,658,089 | 1,572,190 | 1,513,705 | 1,104,016 | 932,734 |
| VI | 208,279 | 209,453 | 277,696 | 252,590 | 144,207 | 124,140 | 265,531 | 224,373 | 156,382 | 123,115 |
| Illinois | 9,968,194 | 8,095,086 | 9,645,370 | 8,050,429 | 8,345,080 | 6,965,264 | 7,538,810 | 5,909,089 | 5,209,095 | 3,921,457 |